The Chemical Age

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Other communications relating to advertisements or general matters should be addressed to the Manager.

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Under which Flag?

FROM the allusions we have made to the work of the various associations which have been formed to protect the interests of scientific and industrial chemists, we believe it will be agreed that we have invariably preserved an impartial mind as to the relative importance of each body. It has not been our policy to interfere with the conduct of other people's affairs, although we have from time to time urged the necessity for unified effort, and have pointed to the hopelessness of individual appeal. Frequently, in the course of conversation it has been suggested to us that no considerable benefits have resulted from the inauguration of the new associations. Our reply has been to encourage the free expression of opinion in our columns, in the belief that every individual is entitled to put forward his particular point of view, and that as a result the cause is furthered. At the present time it would seem that unduly severe criticism of any one body is not likely to assist matters, although no one will resent the recital of a policy which, in the opinion of many, is the only one from which substantial benefit is likely to accrue.

We publish elsewhere a somewhat piquant article from an industrial chemist who has frequently contributed to our columns, and who possesses a gift of penmanship which makes his articles particularly attractive. In his article he modestly claims to be a chemist of but small reputation. We are aware, however, that he speaks for a fairly influential body of workers—a fact which adds all the more importance to the views he expresses. The points raised will, we have no doubt, lend themselves to a certain amount of criticism; and, while we are not in entire agreement with our contributor's suggestions, we firmly believe that there is a good deal to be said in favour of consolidation. The principle brought forward is certainly a novel one, the suggestion being that the industry should be represented by two distinct bodies, both independent but mutually assisting one another in so far as the success of either group is associated with the progress and efficiency of the other. The first group would be a Professional Defence Association, inaugurated primarily for the purpose of protecting those who have attained such qualifications as to deserve the title of "Chemist." It would, in fact, be the representative body of the true professional chemist, excluding those who merely are necessary auxiliaries or camp followers. The interests of the latter would be cared for by a second body, representing skilled workers and apprentices; and, although no actual barrier would be erected between the two groups, the arrangement would certainly afford a means of distinguishing between the qualified members of the industry and the supernumeraries. The scheme is well worth consideration, and we trust that those of our readers who are interested in the matter will make use of our columns for the purpose of ventilating their views.

A Suggestion from Newcastle

THE recent Newcastle meeting will at least be memorable for the variety of topics discussed on unofficial occasions. One cannot, perhaps, pay too much attention to post-prandial inspirations, but we shall be eager to hear if the idea of an "Institute of Chemical Engineers" develops. At the moment, of course, it is merely in the stage of suggestion; but—as the Chemical

Engineering Group has shown—a highly efficient organisation sometimes springs from a casual armchair *causerie*. The undesirability of setting up new organisations was recognised when the above-mentioned group was formed within the Society of Chemical Industry. Albeit, new ground must be broken if a body having examining and "hall-marking" powers is to be started. It is assumed that the reading of scientific papers by members, and the publication of these papers and other data, would be matters which would be carried through by the existing Chemical Engineering Group, the function of the proposed organisation being somewhat on the lines of the Institutes of Chemistry and Physics. The matter is one of importance in view of the suggested formation of a Federation of Engineering Institutions to carry out the generally accepted principle of registration as the proper, if not the only means of securing general compliance with a standard of qualifications adequate to safeguard the interests of the community on the one hand, and to maintain the prestige of the profession on the other. One suggestion is that the two leading institutions—the "Civils" and the "Mechanicals"—should together form the nucleus of a governing body, and should become the registering council or authority accepting for registration candidates who hold the certificate of an approved sectional institution.

It would seem that the first step must be that of coming to a definite agreement as to what a chemical engineer is, and what he must have done in the days of his training in order to merit the title. In drawing up the articles we can see the leading spirits of the new movement embroiled over the question of "shop-training" as an essential condition of membership; and, in the event of this being decided upon as a hard-and-fast requirement, we can well imagine the plight of the middle-aged aspirant who, possessing all the necessary academic qualifications for admission, finds himself having to do time at the lathe in order to gain admittance to the portals. Truly, a painful reminder of a mis-spent youth.

American Institute of Chemical Engineers

Chemical and Metallurgical Engineering for July 14 contains a brief report of the twelfth semi-annual meeting of the American Institute of Chemical Engineers held at Montreal from June 26 to July 5.

The Institute, started twelve years ago, has a membership roll of about 400, some 40 to 50 members having been added during the past six months. In discussing the future the President laid emphasis on membership quality rather than quantity, and quoted as his text 2nd Corinthians, third chapter, part of sixth verse, which reads as follows: "Not of the letter of the law, but of the spirit, for the letter killeth, but the spirit giveth life." While we cannot accept as sound some of the reasons given for limiting membership of this professional body, we should in general like to see more of the American spirit infused into the movement in this country. Referring to the conception of what constitutes a chemical engineer, the president, Mr. David Wesson, would seem to adopt a broad basis—a chemical manager—that is, one who manages enterprises requiring the knowledge and application of chemistry. It is desired to include on the Institute register the leaders of all branches of chemical industry. While chemical engineering is regarded as a branch of engineering there is no sign of the narrow limits suggested by some English writers on this subject.

Liquid Oxygen as an Explosive

THE employment of liquid oxygen as an explosive, and some of the later developments in its use in this manner in Germany were dealt with in an article we published a few weeks ago. Information on the subject has now been carried a stage further by a report which has been issued by the United States Bureau of Mines. When Germany found that the war was going to be a long one, her technical officials began to look for substitutes for civil explosives, so as to conserve the limited supplies of glycerin and nitrates. After the armistice, representatives of the U.S. Bureau visited the occupied area in Germany, and at Longwy they came across a Linde oxygen plant which had, apparently, been erected to provide a source of explosives for the destruction of steelworks. Other plants of the kind were found at Auboué, in the Briey district, and at the Moyeuvre mine in Lorraine. As a result of the American work it is pointed out that, as compared with dynamite and black blasting powder, liquid oxygen is more economical per unit of material blasted, it is less dangerous during transportation, and there is little danger of premature ignition. On the other hand, however, liquid oxygen, on account of the rapidity with which it evaporates, must be used quickly and at a definite time after the charge has been inserted, so that the number of shots which can be fired in a given place is limited, while the firing of group shots is difficult.

Trials have been made in America with various materials in order to determine the most effective absorbent. The substances experimented with were lamp black, wood pulp, crude petroleum, and infusorial earth. A special soaking container was designed, and the explosive was tested in the standard apparatus as well as practically. As a result, the strength of some mixtures, as determined by the ballistic pendulum, was found to exceed that of 40 per cent. nitroglycerin dynamite by from 4 to 12 per cent., while working tests in a quarry indicated that the effect was quite equal to that of dynamite. It must be borne in mind that liquid oxygen cannot be used in the majority of coal mines because it ignites fire-damp, although it would appear to be perfectly safe in mines which are free from gas, or which do not produce dangerous dusts. It seems more likely to find application in quarries, iron, salt and other mineral mines, and possibly for working anthracite. The chief stumbling block would seem to be the necessity of having a liquefying plant near the mine to ensure a supply, while to obtain liquid oxygen at low cost the plant must be kept running regularly. There has, however, been a gradual increase in the cost of production of the standard explosives, and this naturally

increases the extent of the saving which might be effected through the use of liquid oxygen explosives, a fact which may tend to overcome the natural opposition of miners and quarrymen who have used the more common forms of explosives all their lives.

Proposed Manufacture of Ammonium Chloride

In recent issues of The Chemical Age (1920, Vol. II., 466; Vol. III., 56), a detailed description was given of the interesting proposals of the Cumberland Coal, Power & Chemicals Co., Ltd., for the fixation of nitrogen in this country by operating the Haber synthesis of ammonia at far higher pressures than are usually employed, in accordance with the procedure adopted by M. Claude. Apart from the use of these high pressures, it is proposed to manufacture ammonium chloride in place of the more usual sulphate, utilising for this purpose Schreib's modification of the Solvay ammonia-soda process, in which ammonium chloride is normally obtained as a by-product.

The process of precipitation described appears on paper to be somewhat complicated, and no details are given of the completeness of the various precipitations, but experience alone can show whether or not the procedure in question is more economical in practice than the production of ammonium sulphate by a method involving no evaporation, for instance, by passing ammonia and sulphuric acid at equivalent rates into water, under such conditions that the ammonium sulphate, when once the solution has become saturated, crystallises out as fast as it is formed.

In any case, economic progress in chemical industry is only possible by the introduction of novel methods of procedure, or by the adaptation of known processes to new uses, and while any judgment of M. Claude's proposals, which include the commercial use of pressures of 1,000 atmospheres or over, must necessarily be deferred until the entire procedure has been tried on an adequate scale and under manufacturing conditions, the degree of success of the commercial installation, which is stated to be in course of erection in France, will be watched with considerable interest by all who are concerned with the problem of nitrogen fixation. This interest will be all the more accentuated by M. Claude's long experience of the technical manipulation of gases in low-temperature plants for the separation of air into its elements.

The comparative merits of manufacturing ammonium chloride or sulphate is a matter which concerns the ammonia producer generally, irrespective of whether this is produced synthetically or in the gasification of fuel. It is interesting to note that ammonium chloride has been found to be equal to sulphate in fertilising value, and, as is pointed out in the article in question, ammonium chloride contains 26·2 per cent. of nitrogen, while the sulphate contains only 21·2. This difference is of considerable importance from the point of view of transport, since it means that approximately four tons of chloride are equal in effect to five tons of sulphate.

A point of practical interest in connection with soluble fertilisers generally is the tenacity with which these are held by the soil, as evidenced by their power of resistance against being washed down into the lower layers by the action of rain. Comparative measurements of the relative degrees to which chloride and sulphate exhibit this property, together with the relative velocities at which crops react to nitrogen in these two forms, should be of considerable interest to agriculturists generally.

The American Potash Industry

Our American contemporary, *Chemical Age*, publishes an interesting article on the present condition of the American potash industry. That the demand for the fertiliser is considerable may be gathered from the fact that production plants are running day and night, and contracts in hand are sufficient to demand operation at high pressure for the rest of the year. A year ago the industry was practically stagnant, the majority of the plants stood idle for from six to nine months of the year because, it is stated, American business men thought that Germany was going to send over enormous quantities of potash at a reasonable price. Certainly, the potash arrived, but the producers extracted every cent. from the American market. As an instance of the high rates which were received for the material it is pointed out that the German concerns, while bemoaning the fact that they had lost money on the business, paid dividends of 20 per cent. as a result of their 1919 operations in America. During the war farmers in America paid as much as seven dollars a unit for potash, and even during last winter the imported material was fetching four dollars. The fillip now being experienced by the home industry is largely the result of the high prices paid for imported potash last season. It is said that all the large Nebraska plants are in full operation on contracts which will carry them till next November. At Searles Lake one of the companies is shipping high-grade muriate literally by the train load. At Marysvale, Utah, the Armour Fertiliser Works is installing improvements to decrease the cost of their product after a very satisfactory year's operation. The Utah-Salduro Company, west of Great Salt Lake, is spending 250,000 dollars in extensions of their plant.

The present flourishing condition of the industry does not mean that its troubles are over. The very fact that the European margin between costs and prices charged in America permitted the payment of 20 per cent. dividends despite a loss on their domestic business, shows clearly that European producers can utterly swamp the American plants when once they get back to normal production.

The Calendar

August 9	Society of Chemical Industry General Meeting. 4.30 p.m.	Central House, Finsbury Square, London.
24–28	British Association	Cardiff.
Sept. 21–24	Iron and Steel Institute: General Meeting.	Cardiff.
Oct.	Faraday Society: Symposium on the physics and chemistry of colloids.	London.

Union or Disunion?

(A Plea for the Amalgamation of Interests)

In forwarding this outspoken article our contributor states that as a chemist he is connected with no Association, Institute, or Union. He is anxious for it to be understood, therefore, that his views are entirely unbiassed, and he has merely endeavoured to interpret his own feelings in the matter—feelings which, he says, are shared by many others in the industry. Our own comments on the article will be found in the Editorial columns.

I WANT to join a Union—a wish shared with the enterprising futurist who is nobody and wants to be somebody—for the Chemical Unionist programme is alluring. Its performance would obtain for chemists, including of course myself, better conditions of work, firmer security of tenure, increased salary, greater independence in relation to employment, and the other seductive delights that we are informed make life so much worth the living. Unfortunately I am a unit, individual effort makes little impression, concerted action affords promise of success—hence my wish. But a difficulty arises, for I am harassed by competing voices. Were there no choice there would be no problem; it is easy to make a selection when no alternative exists.

My friends, numbering four, belong each to a different body, and doubtless, had I more acquaintances I should hear of more societies. Together they represent the strings, brass, wood, and drums of a chemical orchestra. Individually they are absolutely charming, but if styled collectively a "plethora of chemical sects" they fail to appreciate the charity of candour. When they advertise their wares, each persists in performing his solo fortissimo. The result is a raucous noise in which one discerns no intelligent leadership, but receives the impression that each wishes his own instrument were the entire orchestra. Further, if the music must be a concerto, one and all aspire to play first fiddle; they are not content merely with contributing to the orchestration in accordance with the mind of any composer.

The Limitations of a Union

My friend of the Institute of Chemistry admits he provides no solution to my problem. The Institute cannot assume the active role of a protective association without the possibility of incurring a dire penalty, the surrender of its charter. With an engaging frankness that is almost alarming, he explains that while questions of chemical education, status, and salary lie within the limits of its activities, it is not prepared to act as a chemical trade union. The Institute has done invaluable work in its own particular sphere; unfortunately that sphere does not include my needs.

Another friend urges the claims of the National Union of Scientific Workers and suggests that merely a chemical union is too limited a project. Conceiving a great altruism we must subordinate our sectional wants and seek the amelioration of *all* scientific workers, and in his zeal he proceeds to enumerate the advantages that would accrue to me through paying his merely nominal subscription. I object: a shade of suspicion arises and recalls a relic of schoolday Virgil—*Timeo Danaos et dona ferentes.*

All work should be scientific and, logically, the chiefs of his union would dominate all toilers within our island walls. A trade union is essentially a protesting apparatus; the ambitious aims of my friend's organisation are too catholic for my tastes. I prefer something more modest that has greater prospects of success. Geologists, biologists, anthropologists, do not concern my immediate need, which is a chemical union to safeguard chemical men. Amalgamation of interests may come later, but not yet. The unit is the individual not the society, organisation must proceed from the base upwards, its structure must be molecular not cosmic.

A Liaison With Labour

Upon investigation the above suspicions fructified. Judging from Professor Soddy's address at the Birkbeck College, under the aegis of the union, the latter would appear to be conducting a delicate *affaire* with the Labour Party, and I virtually should have joined the scientific wing of that celebrated body. Whether the *liaison* will result in the union receiving a *congé* or an *invitation—quien sabe?* A political scientist is a difficult problem—a variety of Hieland-Lowlander. Politicians without adjectives are comprehensible species; a scientist merits respect; but I do not profess to follow chemical mermaids.

Professor Soddy thought wise to gibe at things religious—to the amusement of sections of his audience. I confess I do not appreciate the humour. How anticlericalism concerns a chemical union is a mystery, and although a college of cardinals well might envy the pontifical diction of the learned gentleman, it is salutary to remember that there are those, honourable in the counsels of England, who think kindly of Oxford by reason of their affection for many saintly and learned moralists of the City of Spires, who never have heard of the Chair of Physical Chemistry, and possibly not even of the illustrious name of its distinguished holder.

Lastly, revolution figured in no mild manner in the Professor's discourse. Those who have experienced personally the horrors of years of war, and have shared risks with the now silent battalions do not speak of it lightly; they regard with no equanimity a revolution followed, as it would be, by an indeterminate number of years, devoted to reorganising the ensuing chaos. The National Union of Scientific Workers has the option of dissociating itself from the platform utterances of its brilliant speaker, but until such a tacit coalition be dissolved one recollects that foxes do not associate with geese without a purpose.

The British Association of Chemists, a third friend maintains, fulfills my requirements. Questions, however, elicit the statement that it admits to membership those who have acquired at least seven years' practical experience, and have attained a sufficient standard of education *as interpreted by the nominations committee*—yet another instance of a good beginning marred by strategic compromise! One knows well the methods of *legerdemain* by which personal factors may manipulate an elastic statement of rule. In the absence of a minimum requirement one's best "open sesame" is often a good friend. The British Association of Chemist's membership list contains the names of some individuals who have received more than the usual quota of this world's goods, but the average successful qualified man seems largely to have neglected it, and a considerable number of its members do not possess any recognised professional qualification.

The National Association of Industrial Chemists was organised, so the fourth friend states, to improve the conditions of status, salary, of skilled artisans in the chemical industry—men who, if they possess no academic qualification, have attained by diligent evening study a certain standard of scientific knowledge, and who fulfill an important function in both laboratory and works. That is a clear obvious position—which merits more support than doubtless it obtains. It does not attempt the impossible task of seeking to protect everyone, but confines itself mainly to a particular section, the interests of which it guards.

Two Independent Bodies

So much for my friends!

Clearly such internecine, suicidal, diplomatic competition must cease; energy and resources that might be diverted wisely into productive channels are dissipated, and time is frittered in acrimony while other industries grow to manhood.

Admittedly I am a man of but small reputation, yet I fain would lay a suggestion at the feet of the mighty. There would appear to be room in the chemical world for two distinct bodies, and for no more, both independent but mutually assisting one another in so far as the success of either group is associated with the progress and efficiency of the other.

The first, a Professional Defence Association would be organised according to the concept of the corresponding

medical and legal bodies. It would not investigate the qualifications of applicants for membership, but would accept the only recognised professional hallmark—membership of the Institute of Chemistry, it being granted that no professional chemist under the Institute regulations need be without this seal. In the course of time this Association doubtless would acquire a legal status, particularly when the efforts to obtain powers to define the term "chemist" reach a successful issue. Diplomatically organised and conducted it might reasonably hope to receive the support of all professional chemists, and with the moral support of the Institute of Chemistry, if obtained, it should gain the adhesion of practically all the latter's 4,000 members. While in no way under the immediate aegis of the Institute, it would work in co-operation with it, and assume from the latter the care of many matters upon which the Institute members at present wish that body to take action, although not clearly within its functions.

The Second Association would have as its nucleus the present National Association of Industrial Chemists, reinforced by many members of the British Association of Chemists as now constituted, and of many workers who should, but do not, support it. It would represent not the professional chemist—using the adjective as it is understood in other professions in this country—but the skilled worker and the apprentice. With the rational development of chemical works and laboratory staffs, neither body would compete with the other, and no barrier would be erected between the two divisions of workers, whilst by co-ordinated schemes of education an academically-unqualified man might acquire such status as would automatically entitle him to seek membership of the professional division.

A Question of Self-Denial

Either or both of these bodies might be registered trade unions, and the entire chemical industry would be allocated into two sections, each charged with the improvement of the condition of its members. There would appear to be no reason why individuals in their own interests and in those of their fellow workers should not be compelled, at least morally, to subscribe to the articles of their particular association.

We should thus be in a position to be able to say "we have done," instead of "we shall do"—to present accomplished deeds, in place of always crying *mañana*.

One question remains. Are the various Societies at present in existence sufficiently self-denying to assist in propagating such a scheme? The National Union of Scientific Workers professes to be altruistic—let it prove it. The British Association of Chemists claims to safeguard the interests of chemists—it has an opportunity of showing the same in the most economical way. As long as the various unions cling to the survival of the fittest, each hoping itself will survive, so long may they read the parable on the coin of the most democratic nation in Europe.—LIBERTÉ *point* FRATERNITÉ *point* EGALITÉ *point*.

Reviews

A TEXT-BOOK OF ORGANIC CHEMISTRY. By E. de Barry Barnett. 388 pp.+xii. J. & A. Churchill. 15s.

The book is stated in the preface to be a companion volume to the author's Practical Organic Chemistry (279 pages), which on page 40 is described as "the only book in the English language which in any way resembles" the treatises of Lassar-Cohn and Weyl—some 1,800 pages each.

The material incorporated covers the usual syllabus of pass final examinations, and the student who reads it with care will acquire a sound introductory knowledge of the regularities and vagaries of organic group reactions, as opposed to burdening himself with a mass of uninteresting details concerning specific compounds. Industrial applications are mentioned when they are of note, and to the end of some chapters are appended bibliographies, the advantages of which are obvious to a student who wishes to proceed further. From the standpoint of a teacher the author's method of treatment and his ideas of proportion are good.

Unfortunately the volume is marred by a number of statements that probably would not have appeared had the proof-sheets been read more carefully by the author. Of these we venture to quote a selection.

The definition of isomerism on page 22 as "the phenomenon of two or more compounds having different properties, but the same percentage composition" would attract a blue pencil mark from many examiners. On pages 64 and 76 we learn that "alcohols in which two or more hydroxyl groups are attached to the same carbon atom are so unstable that they are incapable of existing." The student hence would be surprised to find on page 93 that such compounds are "exceptional," and seven well-known examples are quoted in the text of the volume.

Pages 68 and 82 inform us that the alcoholates are instantly and completely decomposed by cold water: the action is, of course, actually a balanced one. To speak of a "biting odour" (pp. 105, 295) may be popular but physiologically it is unsound: taste may be half smell, but smell is not half taste. Contrary to what appears on page 225, coal-gas is *not* now usually subjected to "oil-stripping." The abbreviation *ms* is used on page 237, but its explanation is deferred until page 325. Page 249 contains the remarkable assertion that picryl chloride "is identical with *sym*-trinitro benzene, M.P. 116°": the melting point quoted is incorrect for either compound. On page 365 it is stated that the alkaloids—presumably those of the atropine group are indicated—all cause dilatation of the pupil: in point of fact, neither belladonnine nor apoatropine are mydriatics.

In all, some twenty-five typographical errors have been noted. D. I. J.

NOTES ON CHEMICAL RESEARCH. By W. P. Dreaper. Second edition. London: J. & A. Churchill, 1920. Pp. 195. 7s. 6d. net.

In the above book, which is now in its second edition, the author undertakes, with considerable success, the difficult task of commenting on and classifying the many conditions which accompany research work, particularly under industrial conditions.

The direct teaching of the methods of chemical research and the utilisation of academically acquired scientific knowledge as the means of grappling with industrial problems have now a prominent place in our university curricula. It cannot be doubted that a volume of the present nature, in which the successive phases of a typical investigation, beginning with the usual methods of obtaining preliminary information regarding work already published on the subject, and ending with the translation of laboratory results to a commercial stage by way of that often invaluable adjunct to success, the semi-large scale plant, may be read with advantage by students about to enter industrial life, and by many others as well. The aim of practical research is defined as economic gain, and although other branches of chemical work, such as the correct control of plant and the examination of products and of raw materials, play an equally important part in the contribution of chemists to the success of an industrial undertaking, this definition supplies in itself the reason for the inclusion of research in modern business methods.

The book is clearly written and is on good paper. The misprints are confined to several German words and proper names, among these being "Greiss" for Griess on p. 47, "Carro" for Caro on page 117, and "algemeine" for "allgemeine" on page 77. These small inaccuracies do not, however, detract from the utility of the volume. E. B. M.

TECHNICAL METHODS OF ORE ANALYSIS. By A. H. Low. London: Chapman, Hall & Co. Pp. 388. 19s.

We have received a copy of the eighth edition of Mr. Low's well-known book, which is stated to be limited to 10,000 copies.

The study of the analysis of ores must always be a progressive one, since there are always being new methods devised and short cuts to identical conclusions discovered. Therefore, there is plenty of excuse for the publication of new books on this subject—provided the subject-matter is kept up to date. The main body of this book remains the same, but fresh matter has been inserted in the text at various points, and the development of a number of new methods, notably those for molybdenum, potassium, tungsten and uranium have been incorporated in the index.

The book is essentially one for the chemist to refer to in all times of doubt, but it should be very useful to students. The chapters on copper, zinc and uranium can be specially recommended for their lucidity and complete treatment.—C. A.

Electric Telphers for Chemical Works

By Herbert Blyth, A.M.Inst.C.E., A.M.Inst.M.E.

During the past twelve months we have endeavoured to bring out the advantages attendant upon the use of mechanical handling machinery in chemical works, and we have already published several articles on the subject. Mr. Blyth now deals with one of the latest developments, and discusses the important point of the financial saving which may be anticipated when labour gives way to machinery.

Electric telpherage has been known for 38 years as a high-speed conveying system, and therefore it is quite unnecessary to occupy time and space here with any introductory remarks. It will suffice to state that examples of the successful application of telpherage are to be seen in almost every industry, excepting, perhaps, the chemical industry, a fact which is difficult to understand considering the convenience and simplicity of this method of conveying materials. Telpherage has now been adopted by most gas works of any importance, electricity generating stations, the War Department, munition works, and in many miscellaneous factories and stores; but, so far as the author is aware, there are only one or two instances of chemical works having installed telpher plant.

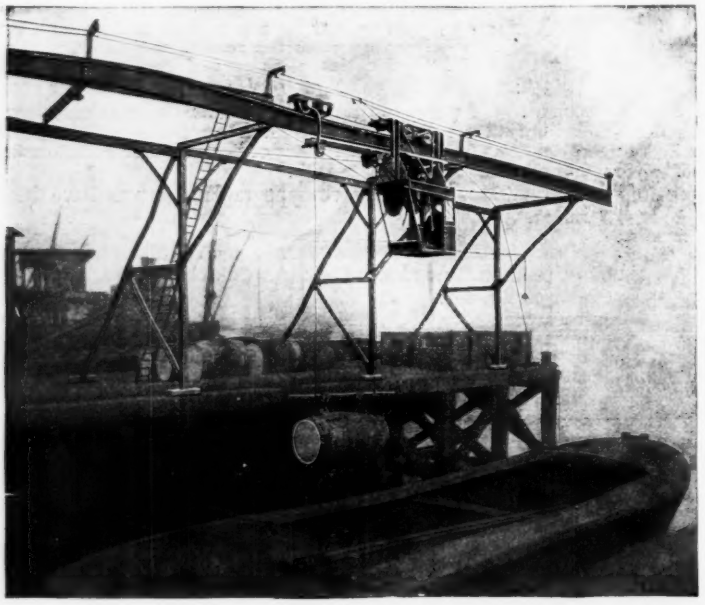

FIG. 1.

It cannot be thought that chemical engineers are in any way prejudiced against a system of which they have not had any personal experience or that they are slow to appreciate the advantages of a labour-aiding device when there is ample evidence available and the long experience of other engineers to prove its usefulness and reliability. Of course, no machine is perfect, and telpherage is not an exception, for in the early days of the telpher many defects and difficulties were met with, as has been the case with every other invention. These difficulties have gradually been overcome, and a satisfactory system developed which can be thoroughly relied upon, even under very severe and unfavourable conditions. It would, therefore, appear that the application of telpherage to the handling problems of most chemical works is associated with some supposed difficulties in connection with established conditions at these works; possibly it is a question of structural alterations which would have to be made to accommodate a telpher. However, no engineer who is responsible for the economical running of a works can afford to put off improvements in the matter of handling his materials simply because of initial difficulties of this kind until he has satisfied himself that the annual charges on the capital cost of alterations and new plant together are not likely to be compensated for by the advantages of greater speed and efficiency which the improved methods would give.

Now, telpherage possesses characteristics which are different from those of any other conveyor.

1. The telpher is a combination of conveyor and elevator, and it will, therefore, perform the double duty of lifting and carrying.

2. The points of loading and discharge are variable within the range of its terminals to an infinite degree; material can, therefore, be "picked up," conveyed or dropped anywhere.

3. The control may be (*a*) directly at the load by means of an operator travelling with the machine, (*b*) from one fixed point, or (*c*) from several independent

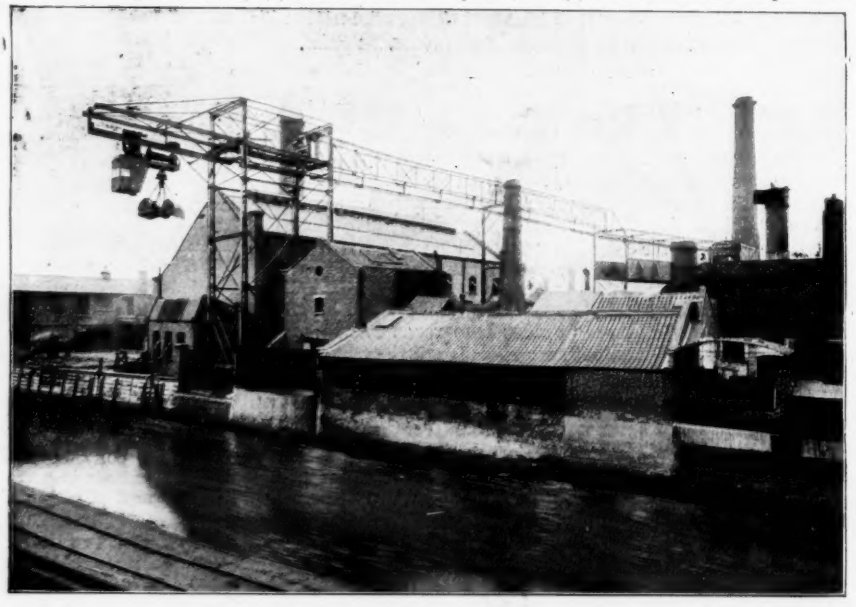

FIG. 2.

points at any distance apart. Generally the direct control is adopted, as it is the simplest, cheapest and most positive.

4. The ratio of cost of wearing parts to that of fixed structure is very low indeed, and therefore the maintenance and depreciation costs are considerably less than for any other conveyor.

5. Telphers of the high-speed type require an operator per machine, whereas in the case of conveyors of the "belt," "push plate" or "bucket" type one operator can attend to the running of two or more conveyors if they are not far apart, and the discharge points do not require frequent alteration. Conveyors of this type cannot, however, be run, as is sometimes supposed, without attention. In fact, owing to their innumerable wearing parts, a great deal of care, inspection and adjustment are necessary to keep them in an efficient condition, and to avoid excessive cost in repairs.

6. A telpher can be automatically loaded from a heap and also similarly discharged by fitting any of the well-known types of grab, or, if the material to be dealt with is more conveniently and quickly handled by a skip, there are

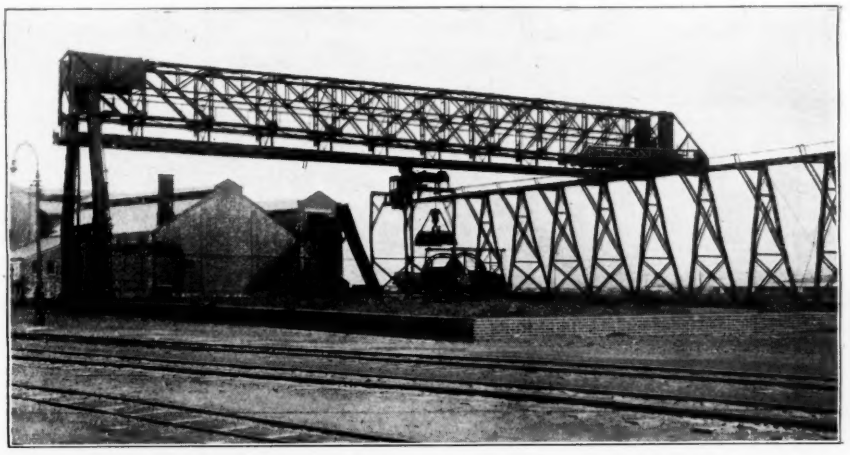

FIG. 3.

simple and effective means of loading the skip automatically from a storage hopper.

7. Any material conveyed by a telpher can be easily and accurately weighed and totalised in transit. It is rather costly to do this automatically; but there are many cases where automatic weighing is essential.

8. The telpher conveyor is not confined either to straight lines or, indeed, to any particular direction. The route may be curved to almost any extent within reason, and branch tracks can be run off in any direction from a main line. A branch track can even be made to travel and maintain contact with a fixed main track when circumstances demand it.

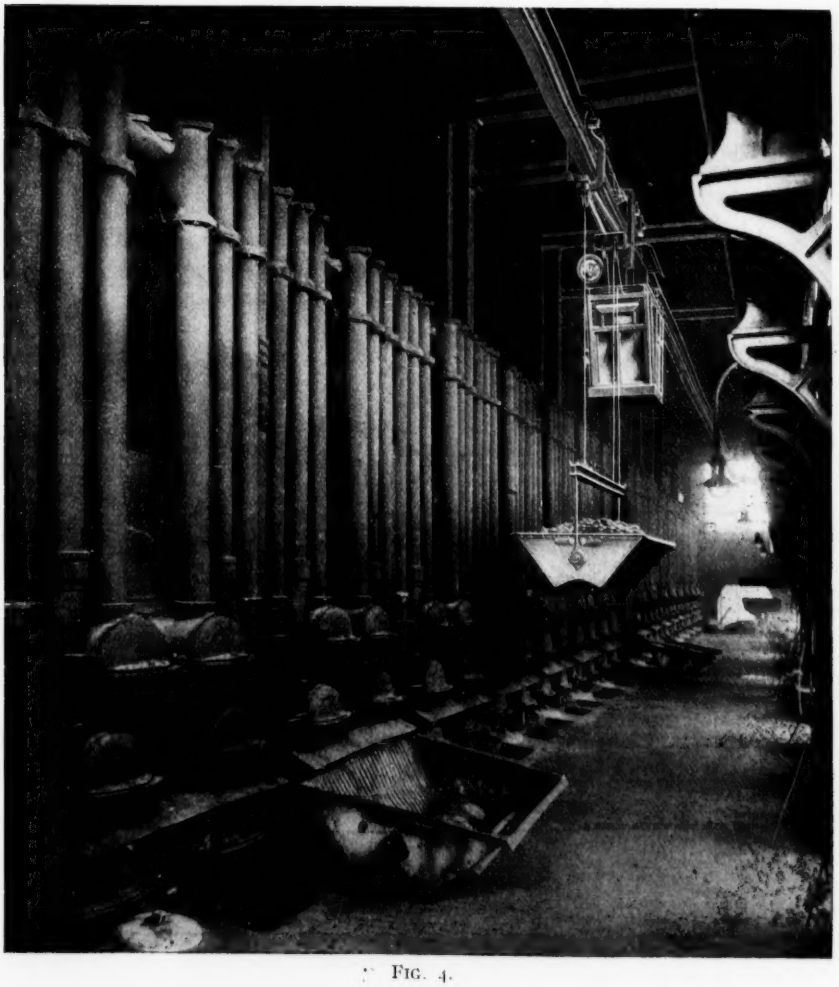

FIG. 4.

The above points and their significance will be better understood by reference to a few illustrations. Fig. 1 shows a telpher plant which was installed at Messrs. Loders & Nucoline's works at Silvertown in 1908 for unloading all their raw materials at the wharf and conveying same to their oil mills. Practically the whole of the output from these mills is dealt with by the telpher plant. Extensions were made in 1915 and again in 1917, when a second wharf and large warehouse were linked up. There are two telpher machines at these works, each having a lifting capacity of 30cwt. at 60 ft. per minute, and a travelling speed of 500 ft. per minute; the track turns many sharp corners and there are two track switches connecting branch tracks. It should be noted, however, that the machines and switches

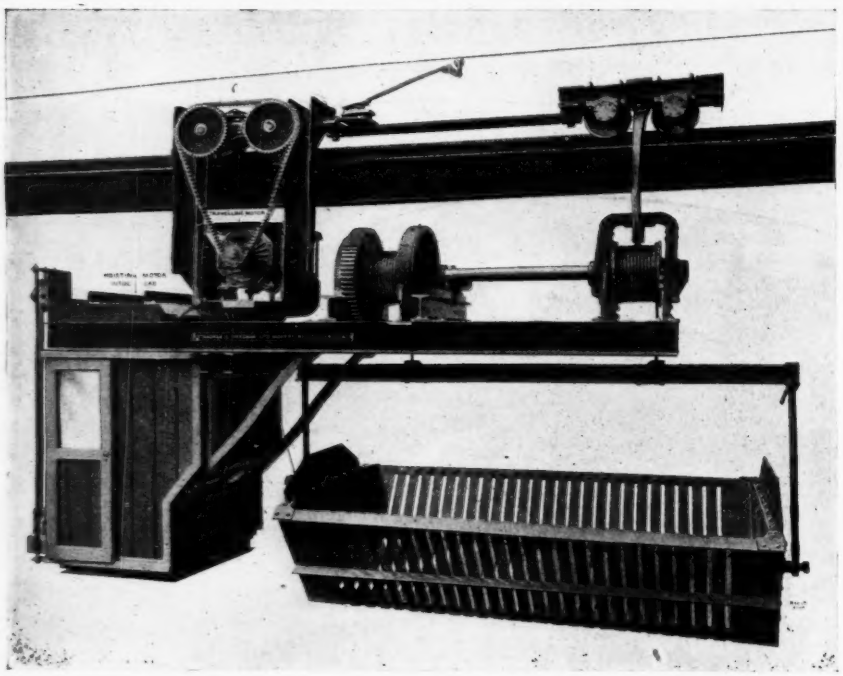

FIG. 5.

here are of an old type and considerable improvements have been made since this plant was installed.

Fig. 2 shows a coal unloading and weighing plant at a London electricity works; this was installed early in 1914, it lifts the coal about 50 ft. and conveys it 300 ft., and has a capacity of 30 tons per hour. The nett weight of coal carried by the grab is weighed as the telpher passes over a "free" portion of the track, which is attached to the weighing mechanism. Each load as weighed is counted and totalised, and the total load can be read off the indicator when the barge is emptied.

Telpherage has been extensively used for handling all kinds of minerals. Fig. 3 shows a plant for "spreading" as well as picking up material from any point within a rectangular area 350 ft. long by 136 ft. wide, the depth of the heap being 10 ft. The capacity of this plant is 40 tons per hour with one telpher, the current consumption 0·15 units per ton, and the present labour costs, at 1s. 6d. per hour, about one halfpenny per ton.

The type of machine for hot coke used in gas works is shown on Fig. 5. A grab can also be fitted to this type of machine for handling any other material besides coke; the lifting capacity may be anything from 1 to 3 tons, the lifting speeds vary from 60 ft. to 100 ft. per minute, and the travelling speeds from 500 ft. to 650 ft. per minute. A general idea of the arrangement of a gas works telpher plant for retort house work can be obtained from Fig. 4.

Track Switches

The method adopted for coupling up fixed branch lines to a main telpher track by means of track switches is clearly seen in Fig. 6. A double-rail steel casting is pivotted on the top of main track (the latter not being cut through by the switch), and it will also be observed that another small length of rail is carried by a swinging arm (generally of channel section) hinged to the side of the track joist. When the switch is operated for connection of the branch track the pivotted rail casting and the swinging rail at the side come into line simultaneously, and thus form a perfectly smooth curve between the fixed end of the branch and the main track. Similarly, when the switch is opened for through traffic on the main track, the other (straight) half of the rail casting falls back into exact alignment with the fixed main line rail, and the swinging arm folds back close to the main track girder, cutting the branch out, and leaving sufficient clearance for the telpher machine to pass. The gear is extremely simple and easy to operate, a force of about 20 lb. at the end of a 15 in. lever being sufficient

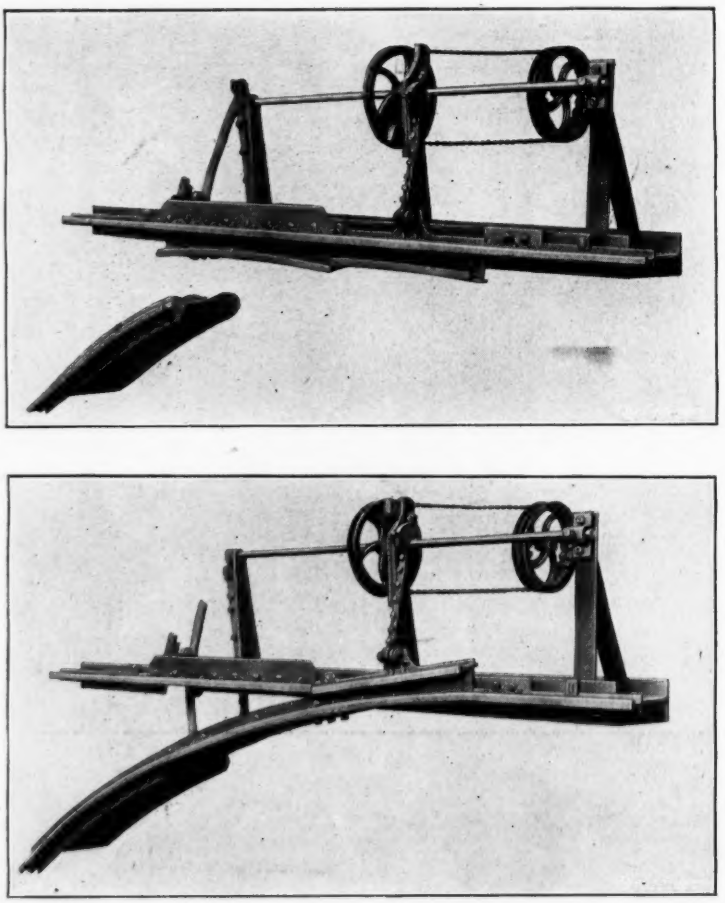

FIG. 6.

to move the switch to either position. The operating lever, or hand wheel, makes exactly half a turn, and the switch becomes locked for either direction by its connecting cranks coming to exactly to "dead centre" in each case. The overhead line switch, for changing the direction of the collecting trolley, is connected to this track-rail switch, and operates simultaneously with it. This form of track switch has proved highly successful, and a large number of them are in general use.

It will be gathered from the illustrations that the telpher is designed to travel upon a single bulb rail, which is clipped to the top flange of the track girder. The whole weight of the machine and the load carried by it is perfectly balanced about the centre of the rail, and the wheel carriages (Fig. 7) are connected to the main frame by means of ball-

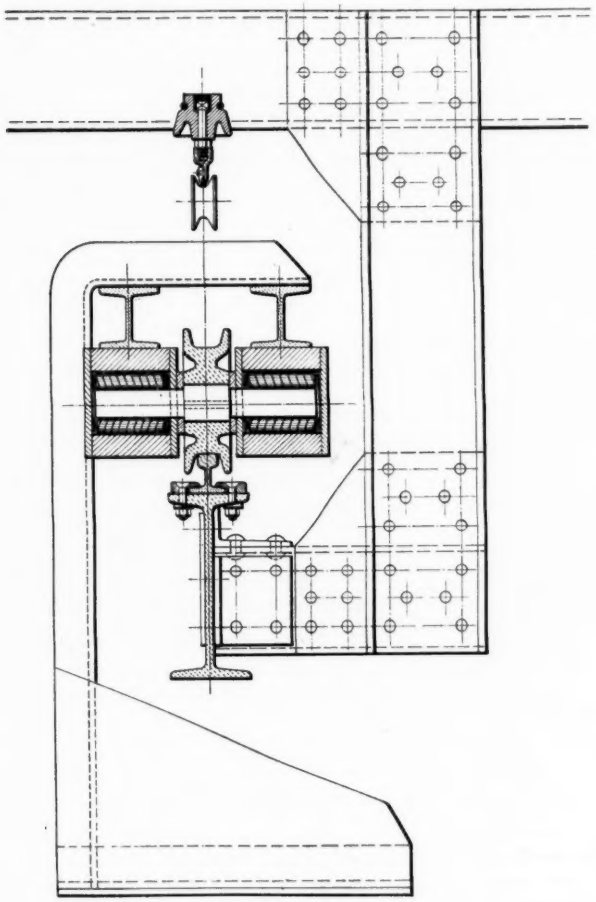

FIG. 7.

bearing swivels. The construction is such that a very high speed can be attained with negligible wear and tear, and with a very low power consumption. Curves of very small radius can be negotiated without any difficulty.

Application in Chemical Works

In order to show the use to which telpherage has been put in chemical works, it is necessary to refer to installations in Germany. For example, at the works of Frederick Bayer & Co., at Leverkusen, telphers are used for handling salt, sodium nitrate, coal, pyrites, &c. They are also in use at the Biebrich works of H. & E. Albert, where a large quantity of superphosphate is handled. The telphers are employed for unloading raw materials from trucks and conveying it to the stores and mills, also for conveying material to the mixing points and for handling the finished products. Again, they are in use at a large calcium carbide works near Cologne, and at many other works on the Continent.

There are one or two chemical works in this country where telpherage has been in use for some time—namely, at the Whitwood Chemical Works and also at the Bradford Dyers' Works. As far as gas works are concerned, particular reference may be made to the telpher installations at Plymouth, Exeter, Cardiff, Southampton, Lea Bridge, Tottenham, Wolverhampton, Widnes, Liverpool, Warrington, Manchester, Hull, Dundee, Glasgow, &c., many of these plants handle considerable quantities of miscellaneous materials, such as oxide of iron, in addition to coke and coal.

Depreciation and Capital Charges

These are, of course, very important items, and a scientific investigation is necessary in order to arrive at correct figures. For instance, it is necessary to exercise careful discrimination between the mechanical characteristics of the various forms of conveyors before deciding which type to instal for any purpose. To take one important characteristic—the ratio of the value of wearing parts to that of fixed structure is worth consideration. This ratio, of course, varies according to the requirements of any particular case, but in a telpher plant it is generally about one part of live machinery to four parts of dead structure. Now, the depreciation is much more rapid on machinery than it is on structure; but, naturally, the depreciation charge against any given plant depends upon the way in which that plant is maintained. A fair amount to spend upon renewals of wearing parts of a telpher plant is 3 per cent., and to keep the structural portion in a safe condition, if a cost of £2 10s. per ton is taken as the cost of cleaning down and re-painting every two years, this would amount to about 2½ per cent. per annum on the capital cost of the structure. Under such conditions a liberal allowance for the depreciation charge would be 12½ per cent. on the machinery (that is a life of eight years), and for the structure 3 per cent. is generally considered sufficient. Hence, for a telpher plant, in which the ratio of machinery value to structure value is one to four, the maintenance and depreciation charges can be stated as follows:—

Maintenance—for the machinery	3 % × 1/5 = 0·6%
for the structure	2½% × 4/5 = 2·0%
Total maintenance charge on the total capital cost	= 2·6%
Depreciation—for the machinery	12½% × 1/5 = 2·5%
for the structure	3 % × 4/5 = 2·4%
Total depreciation charge on the total capital cost	= 4·9%

Total maintenance and depreciation charge for an average telpher plant based on liberal allowances is, therefore, 2·6 per cent. + 4·9 per cent. = 7½ per cent of the total capital cost.

Capital Charge

The present cost of the capital sunk in any plant may be taken as 7 per cent. for the first year; this charge is gradually being reduced, as the capital is paid off by the depreciation or sinking fund, until the last year, when it becomes nil; hence the average annual charge on the original capital cost should be taken as 3½ per cent. Therefore, even for a telpher plant, a total annual charge of 11 per cent. should be reckoned upon. Having arrived at this annual charge, it becomes a simple matter to determine what amount of capital can be spent for each man saved. Taking a man's wages at, say, £3 per week (£156 per annum), and neglecting all other expenses and liabilities which are proportionate to the labour bill, then, by capitalisation of this £156 on the 11 per cent. basis, we obtain an amount of £1,400, which represents the minimum capital value of each man.

When considering the question of maintenance and

depreciation of machinery as a capital charge against any particular plant we must not lose sight of the fact that the "man power" for which that plant is proposed as a substitute has also a "maintenance and depreciation" charge in addition to the wages bill. For example, it is the usual practice to reckon establishment charges on the basis of a percentage on the labour bill. Hence, if the labour is reduced, the establishment charge should be reduced proportionately. It is now generally recognised that in order to keep up the efficiency of man power something more has to be done for the man than merely paying him his wages. There is, first of all, National Insurance, employers' liability for accidents, and in modern works there is a welfare scheme, including canteen arrangements, baths, sports clubs, social clubs, &c. Further, in the future, unless the Government initiate an adequate pension scheme, the employers themselves will probably have to consider seriously this matter in order to provide for their long-service workmen when their energy gives out. In short, a depreciation fund is required for men as well as for machinery.

Steam in Fractional Distillation

By Ralph Shaw

THE fractionation and separation of the various coal tar and paraffin hydrocarbons assumes more importance yearly by reason of their ever-widening application.

The application of the source of heat to the regulation of such distillation presents a crucial problem to the chemist to-day, since quality, quantity and cost of the finished article are inseparably the result of the degree of success attained in the regulation of the steam supply (which is the commonest method of heating).

The general run of distillation plant for oils of the benzene, paraffin and phenol classes consists of steam heated stills provided with a fractionating column, dephlegmator or analyzer, and an ordinary spiral water-cooled condenser.

Steam is led into the mass of liquid by numerous cast-steel or wrought-iron pipes, which are preferably free from internal joints, and which should have a slight incline to permit of any water of condensation being carried away. A steam trap should always be provided for the removal of such water, since any accumulation is a prevalent cause of failure in subsequent fractionation.

The fractionating column is of various design, but consists of a fractional condenser, the "heavier" hydrocarbons being condensed first, and in their return to the still by the segments of the column these constitute a washing liquid for the vapours bubbling up. Only the comparatively light vapours escape condensation in contact with the returning condensate. Since the separation of certain isomers of most series of oils is not complete in such a column, the escaping light vapours are led to an "analyser" or water-cooled container, which is maintained at such a temperature as to allow only small quantities of the lightest and purest isomer to escape, and be finally condensed in the spiral water-cooled condenser. The temperature of the analyser may be maintained at the correct point by the supply of water to circulating pipes in small and regulated quantities. The course of fractionation is almost automatic in well-designed apparatus, since an even flow of liquid at the "coil-end" indicates that vapour is only escaping from the analyser in regular quantities. A syphon pipe is a feature of the analyser, and by this condensed liquid in the analyser is returned to the column by a U-pipe, which prevents a short-circuit between still and condenser. The distillation range of samples leaving the final condenser constitutes the best method of securing pure final fractions, and on coal tar isomers, a distilling range of 0·1°C. to 0·2°C. is quite common.

All condensed oils are sealed with the liquid in the still by leading them to the bottom of the still by a dip pipe, which must be always well below any oil not yet evaporated. Given a constant supply of heat and a constant temperature in the column and analyser, the progress of the operation is almost automatic. Since the water-cooling and air-cooling factors are constant when reasonable care is exercised on the part of the stillman, the outstanding and recognised variable in the heat exchange equation consists in the application of heat to the charge of oils undergoing distillation. This question is the one which agitates the minds of both chemist in charge and the stillman; and any information helping them in this problem is eagerly sought for.

Even the most careful fireman cannot maintain an even pressure of steam, and the regulation of the steam valves on the still is dictated by the rise and fall in the pressures of the steam. This is almost entirely a question of guesswork, however expert the stillman may be, as in any case the increase or decrease in steam has occurred before steps are taken to stop it. A decrease in pressure or in the amount of steam entering the still is the more usual cause of trouble. In this case the whole course of fractionation is frequently upset. The supply of water to the analyser is such as to allow a little vapour to escape, and in the event of a falling-off in supply of heat, this water supply becomes over-adequate; all the vapour entering the analyser is condensed, and the column and analyser are full of returning condensates which, unsupported by their necessary pressure of vapours, coming from the still, rush back by gravity to the still. There, choking all the return pipes and falling on to hot residues, give rise to "blowing" at the coil-end, and complete breakdown of fractionation. The immediate result is a pressure on the still, which should rarely exceed 2 lb. under normal conditions. This increase of still-pressure is a fairly delicate indication of trouble in the course of fractionation, and can be used to correct trouble *before* the distillation is materially upset.

An increase in the amount of steam supplied is almost equally disastrous, as the congestion of the issuing vapours is such as to make the cooling factors, which were adequate for a smaller supply, inadequate for the emergency, and, as a result, isomers of higher B.P. escape condensation and join the final fractons with immediate effect upon the distilling range of samples taken.

Resource is often had to reducing valves on fractionating apparatus, but these are only an amelioration of the trouble; and, although reducing the trouble, rarely eliminate it. Pressure and temperature charts are a useful means of locating trouble, but are only negative factors. The essential fact remains that the trouble has already occurred. In the writer's experience, the pressure on the still remains as the chief factor from which a solution of the difficulty may be looked for. This pressure, which increases under an upsetting of the balance of heat interchange, may be made use of to reduce automatically the pressure entering the still before the variation in heat supply has upset the fractionation.

A susceptible diaphragm of suitable material, such as thin tin foil, may be made to re-act to the pressure on the still in the same way as a piston responds under the pressure of steam in a steam engine. This lateral movement must be translated into a vertical movement which depresses or raises the spindle of the valve through which the steam enters the still. By this means an increase of pressure in the still would immediately reduce the amount of steam entering the coils, until the column and analyser have removed the vapour responsible for the pressure. As the vapours escaped the pressure would gradually fall, and the steam supply would be automatically adjusted to the new conditions.

The design of the regulator must be varied to meet the particular needs of the design of the still and the materials under treatment, but the conception is easily within the scope of the ingenuity of an average works engineer.

British Alkali Works—II.

Annual Report of the Chief Inspector

In last week's issue we published an Abstract of the first portion of the Alkali Report for the year 1919. Below are given the salient points dealt with in the concluding portions of the Report.

Chemical Manure Works

An enlarged and continuous demand for phosphatic manures caused great activity in this industry. Production was, however, affected in some localities by irregular supplies of mineral phosphates so that the full benefits from the many improvements and extensions of manufacturing plant were not obtained. The use of mechanical means for removal of the freshly made superphosphates was widely extended. In many works one of the numerous designs of plant for this purpose already in use elsewhere was introduced, and in other works already supplied with such plant additions were made of fresh units. By these means the capacity of works for producing and dealing with superphosphates was largely increased. At the same time the local conditions inside and in the immediate vicinity of the works were greatly improved. The number and variety of design of such mechanical arrangements continue to increase.

With the active agricultural demand the outlook for the coming season is encouraging, and with adequate supply of mineral phosphates a large production of phosphatic manures may be looked for with the consequent later result of an appreciable increase in agricultural products of home growth.

The following are statistics of importation into the United Kingdom of some of the materials in greatest use for the manufacture of chemical manures :—

		1919.		1918.		1917.
Guano	tons	101	...	Nil	...	2,601
Mineral phosphates	,,	351,187	...	464,747	...	276,617
Nitrate of soda ...	,,	24,485	...	300	...	1,680

Sulphate of Ammonia Works

The number of works registered as sulphate and muriate of ammonia works for 1919 was 632, the same as in 1918, and the number registered as gas liquor works was 107, a decrease of 4, as compared with 1918. The reversion to the manufacture of sulphate of ammonia from production of concentrated liquor continued during the year, and is the reason for the reduction in the number of gas liquor works registered. In some cases the prices obtained for gas liquor combined with the cost and trouble of operating very small sulphate of ammonia plants have led to some of these being stopped for the time, and this development has reduced the number registered as sulphate of ammonia works below what it would otherwise have been.

The noxious gases evolved in the distillation of crude ammoniacal liquor were disposed of satisfactorily by the methods in use in past years. The oxide of iron purifier continued to be the most frequently used means for absorbing sulphuretted hydrogen, the most noxious and offensive constituent of the waste gases. In one works where these gases were utilised directly for the manufacture of sulphuric acid from the sulphuretted hydrogen present in them, it has been found that the additional chamber space required owing to the comparatively large proportion of inert gases seriously impaired the capacity of production of the sulphuric acid plant as a whole. It is therefore under consideration to substitute oxide of iron purification for direct burning of the waste gases, and by this method still utilise the sulphur retained in the purifiers for sulphuric acid manufacture whilst avoiding that unnecessary dilution of the chamber gases which arises when the waste gases as a whole are admitted to the chamber process. In this way the reactions in the chamber process will be speeded up, and the capacity of the existing acid plant will be materially increased.

Professor Cobb's Process

This process has been tried on the working scale for the production of 1 ton of sulphate of ammonia per day. Its working has been technically successful, and the plant is at the present time under modification for the securing of greater commercial efficiency as regards the costs in labour and power.

The production of high grade sulphate of ammonia received much attention in many works, and considerable quantities of dry neutral sulphate were made. The advantage of such salt over the older product containing acid and moisture, in proportion sufficient to influence the physical condition and corrosive tendencies of the commercial salt, are now widely recognised, and the demand for the highest grades may be expected to increase in the home market as well as for export purposes. So far methods for washing the solid salt by ammoniacal liquors of one kind or another have been most frequently brought into use.

On the completion of the armistice large stocks of concentrated ammoniacal liquor were being held, and as the cessation of the large production of high explosives at once took place no immediate use could be found for these stocks. Much was again distilled for the manufacture of sulphate of ammonia. In one works where the existing sulphate plant was already fully occupied, sulphate was made in an improvised plant from the purified concentrated liquor. Complaint was made against the work in question, when enquiry showed that although no sulphuretted hydrogen was discharged, yet the concentrated liquor contained pyridine in sufficient quantity to be offensive. This is the first instance in which pyridine has been recognised as the chief offender in the manufacture of sulphate of ammonia. Means were taken to deal with the cause of offence which was of a temporary character.

Water-sealed change valves for use where two or more purifiers are provided constitute the best means for directing, as desired, the passage of the waste gases from the saturators to any particular purifier or purifiers. An early type of such valve introduced many years ago is open to objection as permitting a temporary escape of noxious gases whilst altering the position of the connecting pipe to direct the waste gases to another purifier, and as being more dangerous whilst being handled than those of later type which prevent any escape of foul gases during the operation of changing connection from one purifier to another.

Direct Recovery

The "direct" and "semi-direct" processes in which the ammonia present in the gases generated from coal by destructive distillation is removed by the action of sulphuric acid continued to give satisfactory results in coke oven practice. In the conditions existing in gas-works, however, the experience was different. The problem of gas purification does not necessarily arise in coke-oven works but, in the smaller gasworks especially, the additional and continuous care required by a process in operation at all times is less attractive than one in which gas-liquor is distilled as occasion and convenience require, and one by which the efficiency of gas purification is less liable to be affected. There is therefore a tendency to revert to the older style of working. This tendency has already led to change in some cases and further instances of a similar character are probable.

Technically speaking, the efficiency of the plant, as now operated in the best-conducted works, apart from the recovery figure for sulphate, leaves little to be desired; but the process still throws on the coal gas purifiers the burden of dealing with the whole of the foul gases in the crude coal gas leaving the retorts—carbon dioxide, sulphuretted hydrogen, and hydrocyanic acid—unlike the older distillation process, in which some 25 per cent. of the carbon dioxide, 7 per cent. of the sulphuretted hydrogen, and a notable proportion of the cyanogen compounds are removed before the crude gases enter the purifiers.

Recent improvements, though undoubtedly affording relief from disorganisation at the purifiers and affecting some conservation of ammonia formerly lost in the effluent still liquors and at the boxes, have done little to reduce the cost of labour in the sulphate house, and it is now a serious consideration with some managers whether economy would not be effected by a conversion of the acid washer or evaporating pan into a saturator of ordinary type, with storage of liquor for periodic operation of the still and with diversion of the foul gases to appropriate purifier or oxide heap. At three of the works the "Direct" process has been now replaced by one of the older distillation type, with marked improvement in the recovery figure for sulphate. At a fourth works replacement of the plant has been temporarily suspended pending trial of a suggested modification to permit of the neutralisation of the ammonia vapours disengaged from the still in an appropriate

lead-lined seal pot fed with acid liquor continuously circulated from the washer, with diversion of the liberated foul gases—carbon dioxide, sulphuretted hydrogen, and hydrocyanic acid—to an oxide heap suitably placed outside the building.

At several of the works improvements continue to be effected in the face of difficulties, both labour and financial. The amount of ammonia lost in the effluent liquor is now less than formerly, due in great measure to the practice of regular sampling and analysis at the works and to more careful liming.

The results of analyses of samples of the liquor from acid washers and of samples of sulphate of ammonia fished therefrom and dried on the steam plate are given. The results are significant, and emphasize the importance of preventing the discharge of vapours from evaporating pans at low levels and in the relatively confined space usually allotted to such apparatus in the "Direct Process."

Nitric Acid Works

The number of this class of works registered for the year was 83, a decrease of 13 compared with 1918. In the smaller number of works upon the register, production in many cases was carried on upon a greatly reduced scale, so that the aggregate production suffered a further fall from the high level of the war period to an even greater extent than the reduction in the number of works alone would indicate. Less pressure was thus put upon the arrangements for condensing the noxious fumes evolved, so that the prevention of undue escape was satisfactory both in those works in which nitrate of soda was decomposed by the action of sulphuric acid and in those works in which nitric acid was made by the condensation of nitrous fumes evolved in various processes.

Chlorine Works

The number and the character of these works were materially affected by different influences. The extension of electrolytic processes led to a further reduction in the proportion of chlorine made by the older chemical methods, whilst a concurrent policy of concentration of production led to a smaller number of larger works being kept in operation for the manufacture of chlorine.

On the other hand the elaboration of methods for liquefaction of chlorine, primarily developed for war purposes, led to the erection of efficient plant for production of large quantities of liquid chlorine. In this way chlorine became available in a portable form for commercial purposes when no longer required for military ones. This led several works to use chlorine in manufacturing operations of a novel character and so require to be registered under the Act. There was thus a reduction in the number of works in which chlorine was made, and an increase in the number of works in which chlorine was used.

This development in the commercial use of liquid chlorine introduces a fresh point for consideration in the chlorine industry, as the storage under pressure of this most offensive gas calls for special precautions which were efficiently carried out.

Tar Works

A fatality occurred in a works of this class. In the course of the inquiry into this case reference was made to the use of respirators. In the absence of definite information as to the particular gases or vapours and the relative amounts of these which may have prejudicial effects, it is desirable to regard the use of respirators with the greatest reserve. Indeed, it may be well that the use of a respirator, through causing a sense of false security, might be a positive additional source of danger were it unsuited to the particular vapours, &c., to which its wearer proposed to expose himself. In cases of the kind thorough ventilation prior to and during the period of exposure to adverse conditions is much to be preferred.

There were active trade conditions throughout the year, and the stocks of pitch existing in some localities at the end of the previous year were greatly reduced.

The adoption of plant for dehydrating tar for road purposes and the like increased. New plants for the complete distillation of tar were also erected, four of which were of the continuous distillation type. On the other hand, in four works, operation of the tar plant was suspended owing to difficulty in obtaining the necessary labour.

MAJUNGA OILFIELDS OF MADAGASCAR.—The directors state that the Royal Dutch Petroleum Company has acquired the properties of the Sakalava Proprietary Oilfields in Madagascar, the concessions of which are adjacent to those of the Majunga Company.

Cotton Research Association

Recent Appointments

DR. A. W. CROSSLEY, director of the British Cotton Industry Research Association, announces the following appointments:

Colloid chemistry and physics, Mr. F. D. Farrow and Dr. A. M. Williams.

General and inorganic chemistry, Dr. D. Clibbens.

Organic chemistry, Mr. R. G. Fargher.

Botany, Dr. S. C. Harland.

Mr. Farrow graduated at the University of New Zealand as M.Sc., with honours in physical chemistry. He then carried out research work under Professor Donnan in the Muspratt Laboratories of the University of Liverpool, and had a brief teaching experience previous to joining the army, in which he became captain and chemical adviser to the Cavalry Corps.

Dr. Williams is a M.A. and D.Sc. of Edinburgh University, where he studied under Professor James Walker. He obtained an 1851 exhibition in 1911-14, and studied with Professor Arrhenius at the Nobel Institute, Stockholm, and with Professor Donnan at University College, London. Until accepting the above appointment he occupied the position of senior lecturer in the chemistry department, University of Edinburgh. During the war his services as a research chemist were utilised by the Government.

Dr. Clibbens is a graduate of Bristol University (B.Sc. with first class honours in chemistry), London University (B.Sc. with first class honours in chemistry), and Jena University (Ph.D.). He was awarded an 1851 exhibition in 1912, and worked for two years under Professor Knorr at Jena. He continued research work on returning to England in the spring of 1914 until joining the army in the following December. He served with the Special Companies R.E. (Gas Services) till December, 1916, when he was recalled by the Ministry of Munitions for special chemical work in connection with the manufacture of explosives.

Mr. Fargher studied at Manchester University, where he graduated B.Sc., with honours in chemistry, in 1912, and obtained the M.Sc. degree by research in 1913. He was then appointed research assistant to Professor W. H. Perkin at Oxford, and after one year was appointed to the Wellcome Chemical Research Laboratories, where he is now assistant director. Mr. Fargher's services also were utilised in the capacity of a research chemist during the war.

Dr. Harland was educated at the University of London, King's College, where he graduated B.Sc. in 1912. In 1913 he went to St. Vincent, where he became assistant for cotton research to the Imperial Department of Agriculture for the West Indies. He has carried out much research work in connection with cotton growing, and obtained the degree of D.Sc. University of London in 1919 as a result of this work.

Miss M. Bagnall, who has just obtained the B.Sc. degree, with honours in chemistry, at Manchester University, has been appointed librarian to the Association.

Recent Wills

Mr. J. S. Stevenson, formerly a director of the Jarrow Chemical Works	£7,470
Mr. H. S. Sutton, of Neath, metallurgist	£67,560
Mr. G. G. Mason, of Mason's Oil Mills, Ipswich, now amalgamated with the British Oil & Cake Co., a member of the Ipswich Dock Commission	£20,231
Mr. T. C. Lofthouse, of Fleetwood, chemist	£1,467
Mr. T. Pipe, of Pollokshields, chemical manufacturer	£17,741
Mr. B. Cochran, of Awrworth-on-Tees, Durham, a director of the Teans By-Products Coke Co., Ltd., and formerly engaged in the iron and coke industry at Middlesbrough (net personality £72,578)	£73,075
Col. Sir Charles Allen, V.D., chairman of Sir Henry Bessemer & Co., Ltd., and of the Ebbw Vale Steel, Iron & Coal Co., Ltd.	£98,593
Dr. J. E. Reynolds, F.R.S., of Inverness Gardens, London, W., professor of chemistry and chemical philosophy at Dublin University, and later professor of analytical chemistry to the Dublin Royal Society	£1,461
Dr. Bernard More, of Hampstead, N.W., metallurgist, for many years a director of the Mond Nickel Company	£44,653

Where the Germans Got Glycerine

By E. S. Grew

WHERE the Germans got the glycerine for the manufacture of high explosives was one of the mysteries of the last two years of the war. It was a puzzle not merely to the British Government, one of whose members made the belated announcement that glycerine could be derived from lard, but to English chemists who were aware that fats, of which lard was one, were the sole substances from which glycerine hitherto had been derived. We had closed down by the blockade the entrance to Germany of fats from the outside, and during 1917 and 1918 it did not seem possible that she could have fats enough to keep her population alive and furnish the glycerine for explosives as well. Somehow she was managing. Yet, theoretically, she ought not to have been able to do so, and a circumstance which supported the theory, though it was contradicted by the facts, was that she appeared to have no soap. Soap is also made out of fats. In short, she evidently was short of fats; yet she had the glycerine.

The contradiction could only be reconciled on the supposition that she was getting glycerine out of something other than fat. That is exactly what she was doing, and the story of how she did it is one of the curiosities of research. The story begins with Pasteur. Many years ago the great Frenchman's work explored the splitting up of the cells of substances by enzymes, or, to use a simpler word for the purpose of this argument, the power of yeasts. By yeasts, the cells of sugar can be split up into alcohol and carbonic acid gas. All these are simple substances, yet nothing except these powerful yeast enzymes will do the conjuring trick. Long after Pasteur's classic researches, both while he was living and after he was dead, chemists sought to find the key of the mechanism whereby this wonderful transformation is effected. In connection with the transformation there are two side products. Besides the alcohol and the carbonic acid into which the sugar is split, there was always a small quantity of acetic aldehyde, and, still more mysterious, a minute quantity of glycerine. The quantity of glycerine was proportionately very small.

"A Purely Academic Problem"

The aldehydes are the substances which lend flavour to the various forms of drinkable alcohol; so that from an industrial point of view there might have been, though there was not, some profit in following them up. But that was not the research chemist's incentive. He continued to investigate the acetic aldehyde, which might be expected to vary according to the amount of oxidation which the alcohol underwent; and also to probe that surprising appearance of glycerine, because these phenomena might afford some explanation of the way the transformation was worked. It was, you might say, a purely academic problem, on which the governing bodies even of research institutions were inclined to frown because it appeared to lead to nothing profitable. Dr. Harden, in London (and at the Lister Institute as a matter of record), had done a good deal with the problem up to the outbreak of war, and his researches were well known to the German chemists. Among the ramifications of his researches it became known that of the transformations into alcohol and carbonic acid, acetic aldehyde and glycerine were effected in the presence of certain sulphides, the amount of acetic aldehyde left after the conversion was much increased. The fragmentary quantity of glycerine increased with it.

Why Germany Was Short of Sugar

The German chemist Neubauer vigorously prosecuted the inquiry from this point during the first two years of the war. He prosecuted it to such valuable effect that the 20 per cent. of acetic aldehyde which could be got was still further increased, the glycerine increasing with it, and to cut a long story short, eventually the amount of glycerine that could be got out of sugar was no less than 30 per cent. That is where the Germans got their glycerine during the last years of the war; and that is why, though Germany is a country which used to export £11,000,000 of sugar a year, they were short of sugar for domestic purposes. If it had not been for this chemical reaction, the fruit of an inquiry pursued solely for the sake of knowledge by a few isolated chemists, Germany would have had to go out of the war after the first two years of it.—*The Observer*.

School of Rubber Technology

Dr. Schidrowitz Appointed Director

THE Governors of the Northern Polytechnic Institute, Holloway, London, N., are re-establishing in September the School of Rubber Technology. There will be a day course open only to students who have had a thorough training in chemistry, preferably at one of the Universities, and evening classes for those already in the industry. It is proposed to confine also one of the evening classes to students who have had a good chemical training; the other evening class will be for students in works, and others who only want to take the subject up from its more empirical side. The school will be in close touch with the industry as it will be under an advisory committee composed of representatives of the manufacturers, growers, dealers, rubber engineers, &c., and will therefore afford a sound theoretical and practical training for those proposing to enter a rubber factory.

Dr. P. Schidrowitz, who has undertaken to act as director of the courses is one of the leading authorities on rubber in this country. He was educated at St. Charles' College and University College School, London, and subsequently studied chemistry at the Federal Polytechnic, Zurich, and the University of Berne. After a period spent as a works chemist in the Midlands he established a practice as a consultant in London, and has carried out numerous researches, many of a fundamental character, in connection with the scientific and technical aspects of rubber production and manufacture. Apart from the publication of these researches in various scientific and technical journals, he is known as the writer of several articles in the *Encyclopædia Britannica*, as the author of the article on "Rubber" in Thorpe's *Dictionary of Applied Chemistry*, and as the author of a standard work entitled *Rubber* (Methuen, London). During the war Dr. Schidrowitz was occupied with researches, largely of a voluntary character, mainly in connection with materials and processes relating to air-craft manufacture, and was a member of one of the technical committees dealing with certain problems in this connection. He is a member of a number of learned and technical societies, of several of which he has been a member of Council or Committee. He was a vice-chairman of the 4th International Rubber Congress (London), 1914, and is consultant to several leading rubber companies.

Dominions Touring Exhibition

THE Department of Overseas Trade is organising a Dominions Touring Exhibition with the direct object of fostering and developing trade with the Dominions, and enabling manufacturers and merchants to bring their goods to the notice of buyers in all parts of the Empire. Since this country must stand or fall by its export trade, any means by which such trade is fostered and developed should be encouraged and supported to the fullest extent. The exhibition will carry specially selected samples of British manufactured goods to South Africa, Australia, New Zealand and Canada, in which countries certain principal cities will be visited. The tour is designed to be a cheap and effective medium for advertising and selling British-made products in the Dominions.

The Dominions Governments are offering every facility, and are assisting by providing Exhibition Halls and arranging reduced fares, freights, &c., and the active co-operation of His Majesty's Trade Commissioners may be relied upon. Trading with the Dominions does not present the difficulties experienced in trading with foreign markets—the varying rate of exchange, the language question, the many and varied terms of payment, granting of credits, &c. The Dominions require high grade British goods, notably: textiles, clothing, glassware of all descriptions, china and earthenware, paper, machinery, leather, scientific instruments, optical goods and spectacle ware.

Enterprising, far-seeing manufacturers and merchants in the United Kingdom with goods suitable for these countries should take advantage of the present opportunity offered by the Dominions Touring Exhibition to secure these rich overseas markets for their goods.

International Chemical Conference

THE current issue of the *Journal of the Society of Chemical Industry* contains an account of the proceedings of the International Chemical Conference, which was held in Rome from June 21-25 under the presidency of Professor C. Moureu, from which the following has been abstracted :—

At a meeting of the Council, Canada, Denmark, Spain, Greece, the Netherlands, Czecho-Slovakia, and Poland were admitted to membership in addition to the five nations who founded the Union (Belgium, France, Italy, the United Kingdom and the United States).

The sessions were held in the rooms of the Accademia dei Lincei, in the Corsini Palace, and each one was presided over by a different foreign delegate. The scheme of organisation of the International Union of Pure and Applied Chemistry decided upon by the Conference is as follows :—

To qualify for membership in the International Union, a country must first co-ordinate its various chemical societies by founding either a national council composed of the representatives of such societies or a federation.

The Union is administered by a Council consisting of delegates of each of the countries adhering to the Union, and the executive power of the Council is vested in a Bureau. The General Assembly is the supreme authority. Permanent relations between the chemical organisations of the associated countries are assured by the establishment of a special organisation—l'Office Internationale de la Chimie—which is under the control of the Council of the Union and the direction of an executive committee ; it carries out the programme drawn up by the Council and defined by the Bureau. Finally, there is a Consultative Committee, divided into sections corresponding to the different scientific and industrial branches, which secures the adequate representation of all departments of pure and applied chemistry and reports upon questions of detail. The associated countries are represented in each section by delegates nominated for three years by the official national body attached to the Union. The delegates of any one nation are to constitute a National Committee, the function of which is to study for that nation the development of knowledge in science, industry, and commerce from the standpoint of chemistry.

A meeting of the Council of the permanent Commissions attached to the Consultative Committee and to the General Assembly is to be held annually under the name of the International Chemical Conference.

It was also decided that the International Chemical Conference should become every fourth year the International Congress of Pure and Applied Chemistry, at which the elections to the Council, the permanent commissions and the consultative committee will take place. English, French and Italian are the accepted languages of the conference, but communications may be made in another language if a translation or summary in the accepted languages be provided. The Council of the Union may, within the limits of the funds voted each year by the General Assembly, encourage research by awarding prizes and medals to the authors of important work.

As the result of reports and suggestions furnished by various members of the Conference it was decided that the Council should organise a chemical standards bureau comprising three sections, viz., chemical standards, pure chemicals for research, and commercial products, and that a body of persons with technical and legal qualifications should be appointed to consider problems relating to patents, the first question to be considered being the legal value of "sealed envelopes," and the creation of international patents. Italy is to prepare a scheme of organisation. A provisional committee was set up to investigate the subject of thermo-chemical data and standards, and a report by Professor W. D. Bancroft (chairman of the Division of Chemistry and Chemical Technology, U.S.A.) on the International Commission for Atomic Weights, led to the constitution of a commission for this purpose, and the request that Messrs. Thorpe, Clarke and Urban, members of the former commission, should continue their work for another year. The Conference also decided that the International Committee for Tables of Constants should be attached to the Union.

The following proposals were placed on the Agenda for the next International Conference (to be held at Warsaw in 1921) : (1) The table of atomic weights should be revised every ten years, so as to allow the commission and research workers sufficient time to check the available data ; (2) That Dalton's proposition, accepted by Avogadro and Cannizzaro, to take the atomic weight of hydrogen as unity, should be reverted to.

Chemical Matters in Parliament

Aluminium Imports from Germany

In reply to Sir A. Steel-Maitland (House of Commons, August 3), who asked what were the imports of articles of aluminium from Germany during the first half of the present year as compared with the same periods in 1913 and 1914, Mr. Bridgeman stated that from January to June of this year the registered imports of aluminium and articles made of aluminium *consigned* from Germany, amounted to 500 tons. During the same period in 1914, 395 tons were imported, and in 1913, 479 tons. The value of these imports was £127,889, £49,900 and £58,160 respectively.

South Uist Kelp Industry

Mr. Munro, replying to Dr. Murray (House of Commons, August 3), said that the Board of Agriculture were investigating the conditions under which the Kelp industry is conducted in South Uist, and are taking such steps as are within their competence for the benefit of the industry. The Board have the circumstances fully in view, and he thought further inquiry was unnecessary.

Railway Rates (Goods) Increase

Sir E. Geddes, in reply to Mr. Gilbert (House of Commons, August 2), stated that the Report of the Rates Advisory Committee, as regards increasing the rates and charges for merchandise and other traffic by freight and passenger train, had just been received, and was under consideration. It was proposed that the increases should come into operation on September 1, which was the earliest date by which the necessary arrangements could be made.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIALS.	REF. NO.
Paris	Glassware	128
Riga	Cocoanut oil ; resin	134
Venezuela ...	Paints ; oils ; varnishes ...	151
Paris	Raw materials for the perfumery industry	129
Valparaiso ...	Chemicals ; paint	—
Brussels ...	Tallow ; palm oil	160
Montreal ...	Chemicals for plup mills	153
China... ...	Heavy chemicals ; caustic soda ; soda ash ; commercial chemicals	163 —

Surplus Chemicals and Explosives

The total sum realised by the Disposal Board from the SALE OF SURPLUS WAR STORES and raw material from the Armistice to the end of June, 1920, amounts to £504,000,000, and it is estimated that the stocks still in hand will produce £300,000,000. Of the amount already received £24,911,902 has been obtained from the sale of chemicals and explosives, £37,067,538 from non-ferrous metals, and £8,521,116 from ferrous metals. Among the large individual sales were eleven contracts for nitrate of soda, amounting in all to £7,155,000. As regards ferrous materials, ferrous scrap, and war-like stores, the chief difficulty in disposal arose from the very large stocks which had to be liquidated—stocks far in excess of any immediate demand. The approximate tonnage of materials that have been dealt with is : Ferrous metals, 1,500,000 tons ; non-ferrous metals, 600,000 tons ; explosives and chemicals, 250,000 tons.

From Week to Week

Cambridge University have re-elected MR. A. J. BERRY, College Supervisor in Chemistry, to an ordinary fellowship.

MR. D. R. STEUART has retired from the position of chief chemist to the Broxburn Oil Co., Ltd., after forty years' service.

THE CHEMICAL SOCIETY'S LIBRARY will be closed for stock-taking from Monday, August 9, to Saturday, August 21, inclusive.

Cambridge University has conferred the honorary degree of Doctor of Law on DR. J. J. ABEL, Professor of Pharmacology in Johns Hopkins University.

MR. A. L. ROBINSON, M.B., M.A. (Dublin), has been appointed Lecturer in Chemical Physiology and Assistant Director of the Laboratory at Manchester University.

A fire broke out last week at 14, Magon Street, occupied by WRIGGLESWORTH & COMPANY, Manufacturing Chemists, but through the prompt action of the firemen no material damage was done.

VICKERS, LTD., Broadway, London, S.W., inform us they have opened a depot for Wales and the south-west of England at 43, Park Street, Bristol, at which address they will be glad to receive inquiries for their products.

PROFESSOR JOHN PERRY, F.R.S., Emeritus Professor of Mechanics, Royal College of Science, South Kensington, the great electrical scientist and general treasurer of the British Association, died at 25, Stanley Crescent, W., on Wednesday, aged 70.

It was announced on Tuesday that DILLWYN & CO.'S SPELTER WORKS, at Llansamlet, near Swansea, have closed down owing to the depression in the industry and the lack of raw materials. This is the third spelter works in the Swansea district to close down, the other two being the English Crown and the Swansea Vale Works.

Twelve cases relating to SODA CRYSTALS have been considered by the Complaints Standing Committee of the Profiteering Act. The profits disclosed ranged from 17 per cent. to 53 per cent. on what were purely brokerage transactions. It was decided that all twelve cases should be referred to the Director of Public Prosecutions.

The death is announced of Mr. F. P. S. HARRIS, managing director of the "Shell" Marketing Co., Ltd., Kingsway, W.C. Mr. Harris was an American by birth, and was originally associated with the Anglo-American Oil Co., Ltd. He joined the "Shell" group about 14 years ago, and became general manager of the General Petroleum Co., Ltd., on its formation. Later he went to the Asiatic Petroleum Co., Ltd., and was with them until the "Shell" Marketing Co., Ltd., was started.

At an extraordinary meeting of BRUNNER, MOND & CO., at Liverpool on Wednesday, the resolution, proposed at the ordinary general meeting in June but withdrawn without a vote, to authorise the directors to distribute to universities or other scientific institutions in the United Kingdom for the furtherance of scientific education and research, £100,000 out of the investment surplus reserve account was passed. An amendment limiting the grant to £50,000 was defeated by a large majority.

Prohibition on the export of the following GOODS FROM THE NETHERLANDS has been temporarily raised: All fatty acids, all edible fats, colza oil, cotton-seed oil, coco-nut oil, ground-nut oil, maize oil, olive oil, sesame oil, soya oil, Borneo tallow, China tallow, Japan tallow, mineral wax, paraffin wax, ceresine and vegetable waxes. The existing regulations will remain in force as regards the export of margarine and vegetable butter, &c., licences for which will be issued by the Netherlands Export Company.

The RAYLEIGH MEMORIAL COMMITTEE has decided that the memorial to the late Lord Rayleigh in Westminster Abbey shall take the form of a mural tablet, to be placed near those to Sir Humphrey Davy and Dr. Thomas Young. The execution of the tablet will be entrusted to Mr. Derwent Wood. If, as is expected, there will be a balance remaining after all expenses have been met, the Committee proposes it shall be used to establish a library fund at the Cavendish Laboratory, Cambridge, with which Lord Rayleigh was closely associated.

At a meeting of the West Bromwich Town Council on Friday, July 30, complaint was made of the nuisance caused by the manufacture of chemicals at Great Bridge. Mr. J. Bell urged that the matter should be dealt with at once, and steps taken to prevent the annoyance to the residents and the danger to their health. The Mayor (Ald. J. E. Cox) produced a piece of glass which was chemically corroded, and said the gardens, the curtains in the houses, and the paints on the walls suffered from the effects of the gases. Authority was given to the Sanitary Committee to take any steps necessary.

At an inquest at Paisley on Monday on the body of James Carcerry, the jury returned a verdict of "POISONED BY MUSTARD GAS, contracted while engaged in handling scrap metal drums at engineering works, Barrhead, near Paisley." The jury added a rider that in their opinion there had been carelessness in dealing with the drums at the filling factory. The Ministry of Munitions was represented at the inquiry, and contended that the Department was not to blame. The drums were the property of the American Government, and they had been retained for disposal as scrap. The usual methods of chemical cleaning by neutralising agents had been followed, and the residue of sulphur sludge, which must have stuck to the inside of the drums, evidently required a greater proportion of the other chemical to counteract its effects. The Ministry expert advised that the drums should be filled with water and sunk at sea.

With regard to the recent REPRESENTATIONS MADE BY THE UNITED STATES to the French and British Governments on the subject of equal opportunity for the exploration of oil in those countries over which a mandate is held by either Government, it is understood, a Reuter's message states, that exchanges on the question between Great Britain and the United States have begun to assume a more formal character. The subject has been discussed with Sir Auckland Geddes, and it is believed that the American Embassy in London has been gathering information. Considerable confusion exists in official circles concerning the nature of the Anglo-French and perhaps of other Allied agreements regarding the distribution of oil in Asia Minor. Information is being sought particularly concerning pre-war agreements and the extent of Government control over oilfields as distinguished from the undertakings of private oil interests, which occupy a different status from the international standpoint.

THE SHELL COMPANY last week signed agreements for the acquisition of the Mantasheff, Lianosoff, and Tsatouroff interests in the Grosni petroliferous district in the Northern Caucasus. The Mantasheff and Lianosoff interests are bought outright, and of the Tsatouroff interests 40 per cent. have been secured. The production of the Tsatouroff group is the most extensive and in more peaceful times ought to constitute an important part of the oil controlled by the Shell Company and its group. At the signature of the agreements cheques to the amount of £1,125,000 were signed and delivered to the representatives of the selling interests as a first instalment. From the English point of view this important agreement will be received with great satisfaction, as it is well known that the Standard Oil Company of America is about to secure the Russian Nobel holdings in Baku. Naturally, at present all these properties, being in the hands of the Bolsheviks and not of their lawful owners, represent only a potential value.

A VERDICT OF "ACCIDENTAL DEATH" was returned at the inquest last week regarding the death of William Bosworth (59) for 40 years, an employee at the chemical works of John Nicholson & Son, Ltd., Hunslet, Leeds, who died at the Leeds Infirmary from the effects of burns sustained as a result of falling into a sulphuric acid vat. Mr. R. Hirst, manager of the Sulphuric Acid Department, said that Bosworth's work consisted of testing the strength of the acids in the various vats. To do this he had to go to the bottom of the cistern, in which was an outlet pipe covered by a lead box. When the acid ran into the cistern it went into an iron egg, from which it was forced into a tower 50 ft. to 60 ft. high. If the valve were not shut properly the pressure of the air forced the box out of position, and threw it on to its side. This had happened in this case, and Bosworth was straightening the box and was standing on the top of the cistern when an iron hook with which he was trying to turn the box over slipped off, and he lost his balance.

References to Current Literature

British

ANALYSIS. The volumetric estimation of diazo compounds by reduction. E. Knecht and L. Thompson. *J. Soc. Dyers & Col.*, August, 215-219.

The estimation of nickel in steels by direct titration. E. H. Hall. *J. Soc. Chem. Ind.*, July 31, 253-254T.

A gas analysis apparatus accurate to 0·001 per cent. mainly designed for respiratory exchange work. A. Krogh. *Biochem. J.*, July, 267-282.

Rapid volumetric methods for the estimation of amino-acids, organic acids, and organic bases. F. W. Foreman. *Biochem. J.*, July, 451-473.

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BRONZE. The composition of ancient Eastern bronzes. M. Chikashige. *Chem. Soc. Trans.*, July, 917-922.

CARBONISATION. The transition from coal to coke. E. Sinkinson. *Chem. Soc. Trans.*, July, 839-843.

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The corrosion of coke oven walls. W. J. Rees. *J. Soc. Chem. Ind.*, July 31, 197-198T.

Modern by-product coke-oven construction. W. A. Ward. *J. Soc. Chem. Ind.*, July 31, 198-211T.

A number of types of coke oven are described and illustrated.

COMBUSTION. The ignition of gases I., ignition by the impulsive electric discharge. Mixtures of methane and air. R. V. Wheeler. *Chem. Soc. Trans.*, July, 903-917.

DYES. The constitution of yellow sulphide dyes. J. K. Mazumder and E. R. Watson. *Chem. Soc. Trans.*, July, 830-834.

ELECTRIC FURNACES. Recent developments of the electric furnace in Great Britain. D. F. Campbell. *J. Soc. Chem. Ind.*, July 31, 224-226T.

FILTRATION. Conference on filtration, Newcastle, July, 13-14. *J. Soc. Chem. Ind.*, July 31, 226-233T. The following papers are given in abridged form: E. Hatschek: The principles of technical filtration. W. R. Ormandy: The filtration of colloids. R. A. Sturgeon: The Sturgeon self-discharging centrifuges for separating solids from liquids. S. H. Menzies: The Sharples "Super-centrifuge." B. Bramwell: Design of mechanical filters.

FLOUR. Properties affecting strength in wheaten flour. F. J. Martin. *J. Soc. Chem. Ind.*, July 31, 246-251T. The relation between various properties of flour and "strength" has been investigated.

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Coke-oven gas for town supply. H. E. Wright. *J. Soc. Chem. Ind.*, July 31, 214-216T. Notes on operating a by-product producer gas plant. W. H. Patchell. *J. Inst. Elect. Eng.*, June, 417-430. The working of a Lymn plant is described.

Production of power from blast furnace gas. W. H. Fowles. *J. Inst. Elect., Eng.*, June, 431-463.

HELIUM. Helium: Its production and uses. J. C. McLennan. *Chem. Soc. Trans.*, July, 923-947.

HYDRONAPHTHALENES. Hydrogenation in the naphthalene series. F. M. Rowe. *J. Soc. Chem. Ind.*, July 31, 241-246T.

LEAD. Chemical sheet lead. D. W. Jones. *J. Soc. Chem. Ind.*, July 31, 221-224T. The effect of impurities in lead on resistance to acids has been studied.

PETROLEUM. The oil resources of the British Empire. J Cadman. *J. Roy. Soc. Arts*, July 30, 584-600.

PLANTS. Pectins in various plants. A. J. W. Hornby. *J. Soc. Chem. Ind.*, July 31, 246T.

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SCRUBBERS. The theory of gas scrubbing towers with internal packing. F. G. Donnan and J. Masson. *J. Soc. Chem. Ind.*, July 31, 236-241T.

British Dominions

ALCOHOL. Sulphite waste liquor utilisation. R. H. McKee. *Pulp & Paper Mag.*, July 8, 715-718. A new process of producing alcohol is described.

French

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Simplification of Carot and Raquet's reaction of manganese salts. G. Denigès. *Ann. Chim. Analyt.*, July 15, 215-216.

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ENAMELS. Fish scaling. J. B. Shaw. *J. Amer. Ceram. Soc.*, June, 489-497. Experiments with the object of overcoming this defect are described.

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GLUE. Properties and constitution of glues and gelatines. R. H. Bogue. *Chem. & Met. Eng.*, July 21, 105-109. Continuation of a paper already noted. (*Chem. Age*, III., 106, 134.)

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Experiments on the corrosion of iron and steel. W. D. Richardson. *Amer. Inst. Chem. Eng.*, June 28-29, 94 pp.

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A suggested basis for an index of corrosion for iron and steel. W. D. Richardson. *Amer. Inst. Chem. Eng.*, June 28-29, 8 pp.

METALLURGY. The application of copper-refining practice to other fields. L. Addicks. *Chem. & Met. Eng.*, July 21, 110-112.

Patent Literature

Abstracts of Complete Specifications

145,818. PETROLEUM OILS, PURIFICATION OF. J. J. Hood, 4, Canonbury Park North, London. Application date, February 24, 1919.

The object is to desulphurise mineral or petroleum oils which are obtained naturally or by the destructive distillation of shale or the like. The oil is vaporised and passed over pure granulated alumina prepared from the trihydrate, or from bauxite, or ignited magnesite. The sulphur compounds are thereby dissociated and sulphur is liberated as sulphuretted hydrogen, which may be absorbed by oxide or iron or otherwise. The process is not applicable to cracked oil obtained by the distillation of shale, since the olefins formed by cracking are absorbed by alumina, rendering it ineffective.

145,824. CYANOGEN AND AMMONIA, METHOD OF PRODUCING. R. L. Goold, Birmingham. (From The Balfour-Guthrie Investment Co., 350, California Street, San Francisco, Cal., U.S.A.). Application date, March 25, 1919.

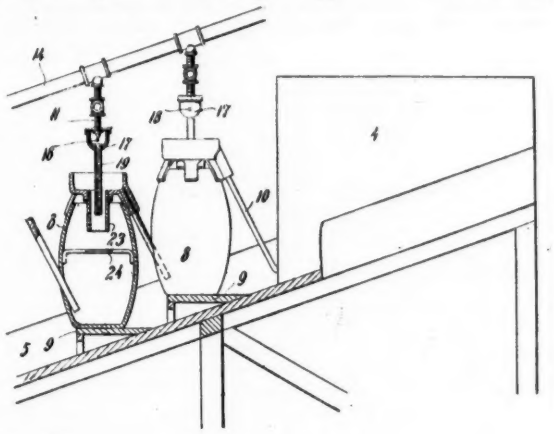
The process is for producing cyanogen and ammonia by the catalytic reaction of nitrogen with hydrogen, or with a carbon compound, such as carbon monoxide or a hydrocarbon. The catalyst consists of a metal of the iron group, an alkaline earth, and an alkali, *e.g.*, iron filings 30 per cent., calcium oxide 50 per cent., and sodium hydroxide 20 per cent. Alternatively, the metal may be nickel or cobalt, the alkaline earth may be magnesium oxide, barium oxide or their carbonates, and the alkali may be potassium oxide or hydroxide, or organic salts, such as the acetate or oxalate. The mixture is mixed with water, briquetted, and then roasted and ground. The catalyst is first subjected to the gaseous mixture at 1,500° to 1,900°F., and is thereby made so active that it is capable of giving a maximum yield if subsequently used at 600° to 1,200°F. If the gaseous mixture consists of nitrogen and producer gas, cyanogen is produced, and if the mixture consists of nitrogen and a hydrocarbon of the methane series, such as natural gas, ammonia and cyanogen are produced. When the activity of the catalyst has decreased it may be revived by heating again to the higher temperature. The catalyst may alternatively be produced by the decomposition of the double cyanides of its components, such as the ferrocyanides of potassium and calcium.

145,852. ORES, CONCENTRATION OF. L. A. Wood and Minerals Separation, Ltd., 62, London Wall, London, E.C.2. Application date, March 29, 1919.

The process is for the concentration of ores by froth-flotation, more particularly the differential separation of copper sulphide and/or carbonaceous material such as graphite or coal, and/or molybdenite, from sulphides of iron, zinc and lead. It has been found that a differential separation of the substances mentioned above is obtained when mineral frothing agents are employed, such as amyl and butyl alcohols, camphor, furfurol, phenol, cresol, aniline, toluidine, picoline, lutidine, or aqueous extracts, such as wood-tar or eucalyptus oil. It is now found that the separation is improved if a small quantity of alkali silicate, hydroxide, or carbonate is added to the mineral frothing agent. Several examples of the differential separation of ores are given.

145,870. ORES, CONCENTRATION OF—AND APPARATUS THEREFOR. Minerals Separation, Ltd., 62, London Wall, London, E.C.2. (From E. H. Emerson, Mountain Lakes, N.J., U.S.A.). Application date, April 1, 1919.

The apparatus is for the concentration of ores by the froth-flotation process. The ore pulp is mixed with frothing agents and supplied from a feed tank 4 to the first of a series of separating vessels 8 mounted on steps 9 on an inclined trough 5. The pulp passes through the pipe 10 into the top of the first separator, the second of which is shown in section, and is subjected to aeration and agitation, so that the froth containing some of the mineral constituents overflows into the trough 5 and passes down to a collecting vessel at the bottom. The remainder flows upwards from the bottom of the vessel 8 to the top of the next vessel where the process is repeated, and so on. Water for aerating and agitating the mixture is supplied from the main 14 to injectors 11, the outlets of which are arranged in cups 17 provided with air inlet holes 18 so that a jet of water and air is delivered through the tube 19 into the pipe 23 through which the pulp is supplied. The jet impinges



145,870

against the baffle plate 24 and a thorough mixing and aeration of the pulp is obtained.

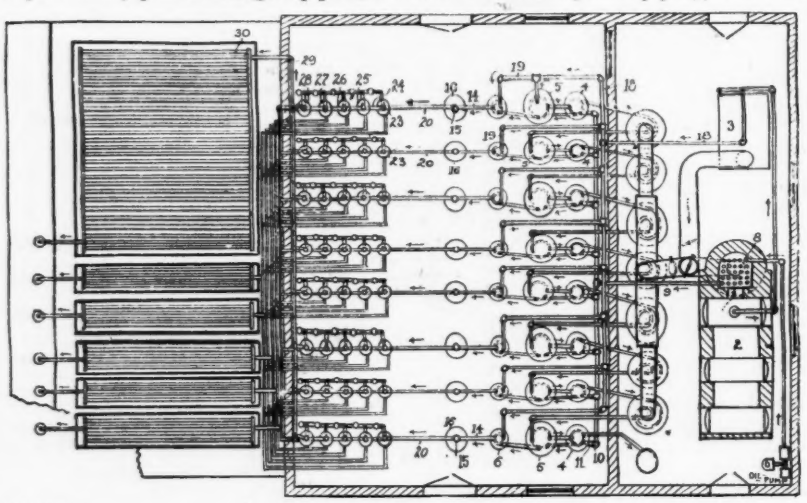
145,871. PROTOCATECHUIC ALDEHYDE, MANUFACTURE OF. Confectionery Ingredients, Ltd., 50, City Road, London, E.C.1; F. E. Matthews, 211, Adelaide Road, Swiss Cottage, London, N.W.; A. T. King, 39, Kenilworth Avenue, Wimbledon; and T. Kane, St. Anns, Wootton Road, Gaywood, Norfolk. Application date, April 1, 1919.

Protocatechuic aldehyde which is employed in the manufacture of vanillin is obtained by treating the acid chloride of an acyl derivative of proto-catechuic acid, such as the acetate, benzoate, carbonic ester, or para-toluene sulphonic ester, or of an aralkyl derivative, such as the benzyl ether, by a hydrogenation process. The derivative is dissolved in toluene, xylene, or other inert solvent, mixed with a metal catalyst, preferably palladium, heated to boiling point, and a current of dry hydrogen passed through. The reduction product is then hydrolysed. The protocatechuic acid derivatives are prepared by blocking the two hydroxy groups by treating with the acyl or aralkyl chloride and the corresponding derivatives of the acid chloride are produced by treating with thionyl chloride. Particulars of the production of di-para-toluene sulphoprotocatechuic aldehyde are given.

145,894. OIL, PROCESS OF REFINING BY DISTILLATION. C. B. Forward, Urbana, Ohio, U.S.A. Application date, April 5, 1919.

The process is for refining crude oil by means of superheated steam. Steam is generated in the boiler 2 and is superheated to 900°F. either in the superheater 3, or in coils within the furnace. The waste heat is utilised by placing a pipe coil 8 in the furnace flue and passing the oil through to pre-heat it. A waste gas temperature of 500° to 600°F. may be used without danger of burning the oil. The heated oil flows under pressure through a pipe 9 to a header 10, having branch pipes 11 leading to the sets of oil heaters 4, 5, 6. Each heater comprises a closed cylinder containing a long pipe of small bore. The pre-heated oil passes through the heaters 4, 5, 6, and in succession and the oil then passes through pipes 14 to atomisers 15, which discharge it into a separator 16 together with superheated steam at high temperature. The steam is supplied from the main superheater 3 through a pipe 18 and branches 19 to each heater 6, and the second heater 5 in the first set is also supplied directly from the superheater 3, but the remaining heater 4 of the first set and 4 and 5 of the succeeding sets are heated by the steam from the cylinder 5 of the first set. The steam from the first heater 5 is reheated in the auxiliary superheaters 7, one for each set of oil heaters. The steam from the last heater 6, which is still at a high temperature is discharged into the separator 16. The volatile constituents pass out through the pipes 20 and the liquid portions are discharged from the bottom of the separator. The vapour from the pipes 20 passes

into the bottom of the first cylinders 23 of the series of cylinders. The rising vapour is sprayed with a measured amount of water, and the remaining vapour passes through a pipe 24 to the bottom of a second cylinder 25, where it is again sprayed with water. Three further cylinders 26, 27, 28 operate in a similar way, so that several fractional distillates are obtained. The vapour finally passes through a pipe 29 to a worm condenser 30



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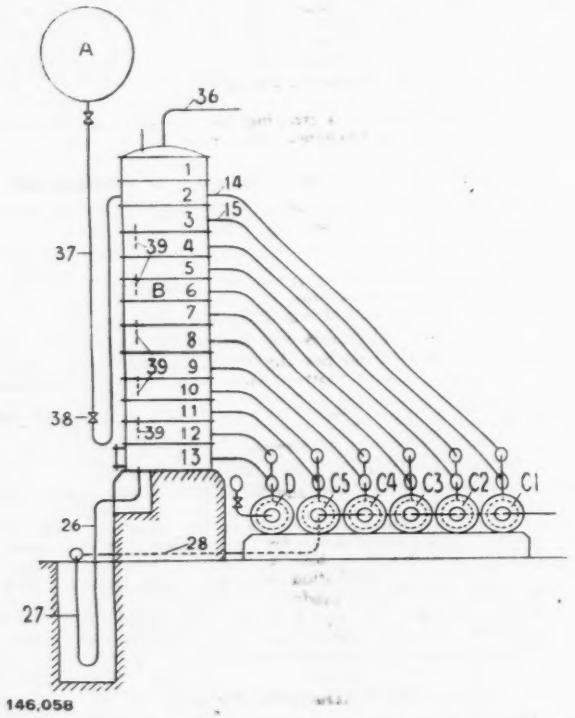
in which gasolene is condensed. The condensate from any of the cylinders 23-28 may be passed back to the coil 8 and treated again, in which case the steam is superheated to a higher temperature to effect the cracking. The absence of direct heating enables the apparatus to be used continuously for long periods without deposition of carbon.

146,058. CONTINUOUS STILLS FOR THE DISSOCIATION OF CHEMICAL SOLUTIONS BY HEAT. R. Fabry, The White Building, Fitzalan Square, Sheffield. Application date, February 10, 1920.



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The apparatus is for treating such solutions as crude ammoniacal liquor, which may be dissociated into caustic ammoniacal liquor, hydrocyanic acid, sulphuretted hydrogen, and carbon dioxide; solutions of alkali bicarbonates which may be converted into carbonates; solutions of alkali bicarbonates and volatile ammonium compounds obtained by washing coal gas with a solution of caustic ammonia and an alkali carbonate. The cold solution passes from a tank A through a pipe 37 to the tray 2 of the dissociating still B, where it absorbs the ammonia from the gases which bubble through it on their way to the outlet 36. The solution then flows through the pipe 14 to the heat exchanger C′ and returns at a higher temperature through the pipe 15 to the tray 3, from which it overflows through the pipe 39 to the tray 4. The solution then passes in succession through the other heat exchangers C^2 to C^5 alternately with the trays down to tray 11. The solution is finally heated to its highest temperature in the steam heater D and then returns to the tray 13 freed from its volatile constituents. The vapour bubbles upwards through the solution in all the trays. The hot dissociated solution passes through the pipes 26, 27, 28, through the heat exchangers C^5 to C′ in succession, where it heats the solution under treatment.

NOTE.—The following specifications which are now accepted were abstracted in THE CHEMICAL AGE when they became open to inspection under the International Convention: 132,232 (E. Piquerez), relating to electric furnaces, *see* Vol. I., page 603; 134,531 (Norsk Hydro-Elektrisk Kvaelstofaktieselskab), relating to production of alumina, *see* Vol. II., page 47.

International Specifications Not Yet Accepted

143,545. DESTRUCTIVE DISTILLATION OF WOOD. E. M. Sawtelle, Englewood, N. J., U.S.A. International Convention date, September 10, 1916.

Acetic acid is produced by the destructive distillation of wood in a gas producer worked without a steam supply. The distillate passes into a liquid separator and then through a number of water-cooled vertical tubes in succession, the condensed liquid being collected from the bottom of each tube. The gases then pass through two scrubbers, the first being packed with broken glass, and the second with broken glass and wood shavings, the condensed liquid being collected from each.

143,550. AMMONIA. Nitrogen Corporation, 55, Canal Street, Providence, R. I., U.S.A. (Assignees of J. C. Clancy, 136, Liberty Street, New York). International Convention date, March 23, 1916.

Ammonia is obtained from nitrogen and hydrogen by synthesis with the aid of a catalyst consisting of calcium cyanamide, or a mixture of sodium, cobalt, and manganese cyanamides and charcoal, at a temperature of 500°-600°C. and pressure of 25-100 atmospheres.

143,848. HYDROGENATING OILS, &C. Soc. Anon. l'Oxhydrique Francaise, 23, Rue Beranger, Malakoff, Seine, France. International Convention date, May 28, 1919.

The reaction vessel is charged with oil and with a larger amount of catalyst than usual and hydrogen is introduced through porous tubes of asbestos or biscuit porcelain immersed in the liquid. A rotary stirring device is provided, and also a device for cleaning the surface of the tubes. After hydrogenation the oil is drawn off through another tube or set of tubes leaving the catalyst in the vessel, and after a fresh charge of oil is added hydrogen is again passed through it, being introduced through the tube by which the oil was previously drawn off. If two sets of tubes are used alternately, the process is rendered continuous.

143,850. AMMONIUM FORMATE. Norsk Hydro-Elektrisk Kvaelstofaktieselskab, 7, Solligaten, Christiania. International Convention date, May 26, 1919.

A product obtained in the fixation of nitrogen containing barium cyanide is treated with water in an autoclave, and after

hydrolysis is treated with carbon dioxide, at a lower pressure. The product contains ammonium formate and barium carbonate mixed with carbon. The barium carbonate may be subsequently mixed with additional carbon and used again for nitrogen fixation. Ammonia may be added during the hydrolysis if the proportion of barium cyanamide with the cyanide is small.

143,854. AMMONIA, SYNTHESIS OF. Norsk Hydro-Elektrisk Kvaelstofaktieselskab, 7, Solligaten, Christiania. International Convention date, May 23, 1919.

The object is to obtain a mixture of nitrogen and hydrogen for the synthesis of ammonia. A metallic sulphide, such as iron pyrites, is treated with steam, producing a mixture of hydrogen and sulphur dioxide, and a further quantity of metallic sulphide is roasted with a limited supply of air, producing a mixture of nitrogen and sulphur dioxide. The sulphur dioxide in both mixtures is removed by means of a suitable absorbent and the nitrogen and hydrogen then mixed and used for the synthesis of ammonia. The sulphur dioxide may be absorbed in water and then recovered, or it may be absorbed with lime or ammonia and the resulting sulphite used for eliminating any residual oxygen in the gases obtained by roasting pyrites.

143,872-3. CALCIUM CARBIDE. Union Carbide Co., 30, East Forty-second Street, New York. (Assignees of F. M. Becket, Niagara Falls, N.Y., U.S.A.). International Convention dates, January 20, 1915, and August 15, 1917.

143,872. Coal is mixed with lime and crushed to about $\frac{1}{8}$ in. mesh and then distilled in an ordinary coke oven, the by-products being recovered. The residue is broken into large lumps and fed while still hot into the carbide furnace. Coal containing about 30 per cent. of volatile matter is preferably used, but if the proportion is more or less, anthracite or bituminuous matter may also be added.

143,873. A mixture of lime and coke, wood charcoal or anthracite with water is briquetted, and the briquettes are dried at ordinary temperature and then gradually heated to 900°C. in a reducing atmosphere preferably free from carbon dioxide. The briquettes are used for making carbide. The mixture may also contain a binder such as tar, molasses, or sulphite pitch.

143,874. TREATING WASTE SULPHITE LIQUORS. Atomised Products Corporation, 115, Broadway, New York. (Assignees of W. H. Dickerson, 123, Waverly Place, New York.) International Convention date, November 16, 1918.

The process is for preparing a dry non-hygroscopic material suitable as a binder, an adhesive, or a tanning agent, from waste sulphite liquors. The liquor, after precipitation of calcium and magnesium, is sprayed at a pressure of 100-1,000 lb. per square inch into a chamber through which flue gas at 200°F. is passed, and a preliminary concentration to 30-60 per cent. is thus obtained. The liquor is then sprayed into another chamber where it is evaporated by the heat of flue gases at 300-500°F., the gases then passing on to the first chamber mentioned above. The calcium and magnesium bases may be precipitated by adding chromium, aluminium, sodium or ammonium sulphate, or sulphuric or oxalic acid. The fine powder thus obtained may be used as a binding material, &c.

143,885. ANTHRAQUINONE. Kinzlberger & Co., Prague, Czecho-Slovakia. International Convention date, September 20, 1917.

Crude anthraquinone is dissolved in chlorbenzene or coal-tar naphtha and then heated with aqueous solutions of caustic alkalis, alkali carbonates or calcium hydroxide to purify it.

143,891. ACETALDEHYDE FROM ACETYLENE. Chemische Fabrik Griesheim-Elektron, Frankfurt-on-Main, Germany. International Convention date, August 10, 1916.

Acetaldehyde is produced by passing acetylene through sulphuric acid or other inorganic or organic acid containing a mercury salt in the proportion of over 10 per cent. The catalyst is rapidly reduced but is continuously regenerated by electrolytic oxidation, using an excess of metallic mercury at the anode, and mercury, lead, platinum, &c., as the cathode. When the operation is commenced, the liquid may contain a mercury salt and a mercury anode, or a mercury salt only, with a platinum anode, or a mercury anode only. In the last case the liquid is first subjected to electrolysis until sufficient mercury salt has been obtained, and acetylene is then passed through it.

LATEST NOTIFICATIONS.

148,264. Production of pure phenolic resins, basic phenolic resins, or phenol esters with a view to obtaining plastic insulating materials, laquers, enamels, and dressing preparations. Soc. Coralex. July 19, 1919.

147,736. Direct recovery of ammonia from the products of the destructive distillation of coal. Still, C. (Form of). December 3, 1915.

147,747. Hydrogenation of naphthalene. Schroeter, G., and Tetralin Ges. August 1, 1916.

147,798. Soluble nitrogenous manures from waste leather and other animal detritus. Devos, H. December 17, 1913.

147,861. Solidified soluble coal-tar derivative disinfectants. Philipson, A. F. March 15, 1918.

147,904. Production of moulded articles from cellulose acetate. Cellon Werke. A. Eichengrun. January 25, 1919.

147,905. Preparation of acids from natural gases, petroleum, mineral oils, and the distillation and decomposition products of these substances, also from carburetted water gas, oil gas, producer gas, tar, water-gas tar, oil-gas tar, and the like. Strache, H. January 20, 1917.

147,906 and 147,907. Production of polyvalent alcohols. Matter, O. December 8, 1913, and April 21, 1915.

147,908 and 147,909. Production of ethylene chloride. Goldschmidt Akt.-Ges, T. May 22, 1915, and February 29, 1916.

148,111. Production of metallic non-phrophoric catalysts. Muller Speisefeltfabrik Akt.-Ges, C. & G.

148,124. Apparatus for dissolving materials in, or impregnating them with acids. Smeu, V. and Juer, G. December 20, 1915.

148,125. Machine for nitrating. Smeu, V. and Juer, G. November 18, 1916.

148,126. Manufacture of tanning agents, and the application thereof. Chemische Fabriken Worms Akt.-Ges. July 20, 1916.

148,139. Derivatives of condensation products of formaldehyde and phenols. Bucherer, H. June 10, 1918.

148,237. Treatment of coking coals for the extraction of the Nitrogen on the Mond gas method. Akt.-Ges. fur Brennstoffvergasung. November 17, 1916.

148,242. Manufacture of manures by opening up phosphates with phosphoric acid. Hemische Fabrik Rhenania Akt.-Ges. May 31, 1918.

148,243. Manufacture of a strewing nitric acid superphosphate. Chemische Fabrik Rhenania Akt.-Ges. April 12, 1919.

Specifications Accepted, with Date of Application

125,984. Liquid mixtures or emulsions, Method of and apparatus for separating. J. P. Pedersen. April 20, 1918.

132,256. Evaporating liquids, Process of. G. A. Krause. July 11, 1917.

132,487. Furnace retorts. C. H. Smith. September 9, 1918.

147,235. Hydrogen, Manufacture of. J. Harger. April 2, 1918.

147,286. Peat, Treatment of. M. C. Olsson. April 16, 1919.

147,304. Catalysis, Apparatus for heating by. R. Camell, L. Cochet, J. Gritte, and Soc. Lyonnaise des Rechauds Catalytiques, Camell, Cochet Gritte et Cie. April 22, 1919. Addition to 17,626/15.

147,311. Destructive distillation of solid fuels. W. Beswick and N. E. Rambush. May 1, 1919.

147,337. Esters, Methods of forming. E. C. R. Marks. (*U.S. Industrial Alcohol Co.*) June 23, 1919.

147,340. Conveyers. J. West and West's Gas Improvements Co. June 26, 1919.

147,341. Feeding granular or powdered material in measured quantities and apparatus therefor. Associated Portland Cement Manufacturers and J. G. Baxter. July 2, 1919.

147,360. Destructive distillation of coal, shale, and so forth. Recovery of valuable products from the gases evolved in. Skinningrove Iron Co. and E. Bury. August 16, 1919.

147,378. Nitrocellulose, Stabilisation of—and apparatus therefor. B. van der Laan. October 2, 1919.

Applications for Patents

Bull, H. J. Process for preparation of anhydrous magnesium chloride. 22,713. July 30. (Norway, August 6, 1919.)

Corthesy, J. H. Distillation of liquid hydrocarbons, &c. 22,720. July 30.

Engelke, E. F. Distillation of hydrocarbon oils, asphalts, &c. 22,373 July 27.
Evans, E. V. Process for removing hydrogen sulphide from gases. 22,585 July 29.
Fabry, R. Process for obtaining sulphur from hydrogen sulphide. 22,185. July 26.
Farbwerke vorm. Meister, Lucius, & Brüning. Process of desulphurising gases. 22,460. July 28. (Germany, July 29, 1919.)
Hartridge, H., and Peters, R. A. Method of determining acidity or alkalinity of fluids. 22,197. July 26.
Kaltenbach, M. H. Process for manufacture of sulphuric acid. 22,606. July 29. (France, February 18.)
Leek, A. E., Meeze, E. H., and Olympia Oil & Cake Co. Manufacture of hydrogen by the iron-steam process. 22,188. July 26.
Meakin, A. J. Removing oxide from sheet metal. 22,312. July 27.
Pease, E. L. Extraction of ammonia from gases. 22,534. July 29.
Pfannenschmidt, P. L. Acid chambers, towers, &c. 22,655. July 30. (Germany, July 31, 1919.)
" Pipe connections for acid-gas, &c., mains. 22,806. July 31. (Germany, July 31, 1919.)

Patents Court Cases

AN important judgment has just been delivered by Mr. Justice Sargent on a point of considerable interest to owners of patents which have been adversely affected by the war. It has long been provided (in Sec. 18 of the Patents and Designs Act, 1907) that a patentee might apply for an extension of the normal term of his patent provided that his remuneration had been inadequate and that the invention was of sufficient merit; this application had to be made at least six months before the expiration of his patent. The war has, of course, rendered many patents wholly or partly unworkable during several years, with consequent loss to the patentee, and some patentees have taken the opportunity offered by Sec. 7 of the Patents and Designs Act, 1919, of applying immediately for an extension of their patents owing to war conditions, although they had still several years to run to complete their normal term. Mr. Justice Sargent, however, has decided that this procedure is not admissible, on the grounds that the loss might be more than compensated in the remaining years of the patent, that patents which are now useful might become obsolete before their natural period had expired, and that it is not possible for the Court to determine until near the expiration of the patent whether the *total* remuneration of the patentee has been adequate. The applications are therefore directed to stand over till a date nearer the time of expiration of the patent.

Paine & Co.'s Sports Club

THE first Sports Day of the Sports Club organised by Paine & Co., Ltd., St. Neots, was held in beautiful weather on Saturday, July 24. The sports were organised by the General Committee of the Sports Club, and invitations were issued to all the employees of the firm, with their wives and families, the unmarried employees having the privilege of bringing a friend. About 300 people were present. The events included a tug-of-war between the various departments of the firm, which was won by the Malt Extract Factory, a relay race, departmental teams, won by the office team; 100 yards flat race, 100 yards veteran's race, hurdle race, high jump, long jump, 440 yards flat race, obstacle race, and various races for ladies and children.

At the close of the racing a vote of thanks was proposed by Mr. C. Wilson, and seconded by Mr. A. Pearson, to the directors (Mr. Wellwood McNish and Mr. Malcolm McNish), who officiated as judge and starter respectively throughout the day, and this was heartily carried with cheers and musical honours. Mr. W. McNish, in responding, said how very pleased they had been to attend, and how much they had enjoyed themselves and appreciated the spirit and comradeship of the meeting. He thought that the club had produced some very good athletes, who would be able to uphold the honour of the firm in any field, and he trusted that the club would prosper and flourish; the directors would support it and do all in their power to make it a thorough success. This was the first meeting of its kind in the history of the firm, and he hoped many more would follow. The cricket pitch and tennis court were rather rough for this season, but he hoped that next season they would be able to have properly laid turf for this purpose. He proposed a vote of thanks to the committee, who had worked hard to get such good results.

Alby United Carbide Factories

The Coal Difficulty

THE thirteenth annual meeting of the Alby United Carbide Factories, Ltd., was held in London on Friday, July 30, Lord Southborough, chairman, presiding.

In moving the adoption of the report and accounts the chairman stated that after writing off £28,655 for depreciation, the net profit for 1919 amounted to £27,221. To this must be added £6,837 brought in from the previous period, making available a total of £34,058. After deducting £3,192, the dividend on the 5½ per cent. preference shares, less tax, to December 31, 1919—a balance remained of £30,866 to be carried forward. The amalgamation with Nitrogen Products and Carbide Co., Ltd., having been given effect to in November last, the figures appertaining to that company were incorporated in the balance-sheet. No dividend was received during 1919 from A. S. Meraker, whose business had been adversely affected by the existing economic conditions. From North Western Cyanamide Co. a dividend of 15 per cent. was again received.

"The year 1919 was," Lord Southborough continued, "an unsatisfactory one for us. In the first period of the year it is true that the company did hope that it was wearing down the serious effects of the war. Odda manufactured carbide regularly, and in fair supplies, but we had to combat the competition of our Government in the sale of carbide and similar products. The second quarter of the year, passed under similar conditions, was not so good as the first as regards the sale of carbide, and then came the third quarter, when Norway suffered from a general strike in the electro-chemical industries, the factories were closed down, no boats could be loaded, and there was complete stagnation. The strike was eventually settled, but I think I am within the mark when I say that this strike cost us about £100,000. In the concluding months of the year, as you can well understand, it was hard to get going again, and it was only in November and December that the production of carbide made a decent showing.

"The want of coal is the keynote of our troubles. During the war such facilities as were possible were given us to work our factories, as the Government required our products not only in Europe but wherever Allied troops were engaged; but, shortly after the Armistice, the Coal Controller adopted the attitude that, as our works are located in Norway, he could only recognise us as a Norwegian company, and this although our domicile is British, and great care has no doubt been taken to see that we pay to the uttermost farthing our British taxes and British duties. I remark, incidentally, that we have also the Norwegian taxes and duties to pay, and we can assure you that they do not lighten our burden. The supplies of anthracite grew less and less, and during the period since the date of these accounts have nearly ceased altogether. Carbide of calcium is a mixture of carbon and lime, fused in an electrical furnace. The best form of carbon for the purpose is anthracite coal, and the next best is coke. Anthracite is therefore essential to us, but the amount we require is relatively small—namely, only about 50,000 tons a year. We also require about half that tonnage of gas coal for the reduction of limestone to lime by burning. You will observe that this is but a comparatively small matter in coal tonnage, and I fail to find any reason why, having regard to our manufacture of carbide and fertilisers—the need for fertilisers grows more acute every day—we should not be allowed a preference, on this small tonnage, for a British company out of the rations of coal for export." (Hear, hear.)

Before the report and accounts were adopted a shareholder asked the chairman to accept an addendum to the resolution moved from the chair, to the effect that after receiving and adopting the report and balance-sheet, the words should be added, "and that a committee of four shareholders, with power to add to their number, be appointed to confer with the board on the position of the company and the best means to be adopted to promote its successful working in the future." After some further discussion, the chairman, having consulted with the other members of the board, agreed to welcome the suggested committee. An amendment accepting the report and accounts, and appointing an advisory committee, to consist of Mr. Henry Hoare, Colonel Micklem, Mr. Sandford, W. Poole, and Sir W. B. Peat, with power to add to their number, was carried on a show of hands by a large majority, and it was subsequently adopted as a substantive resolution.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co. and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

Market Report

THURSDAY, August 5.

Business has hardly resumed its normal course at the time of writing, many people still being away on holiday.

As far as indications go, however, business has reopened with a better tone, and in some directions quite a satisfactory volume of business has been transacted.

Values of some imported articles have already stiffened, in sympathy with higher prices on the Continent, and declining American exchanges.

The export demand has opened very brightly, especially for a number of heavy products, and we shall be surprised if the opinion we expressed in our last report as to better business ahead is not quickly justified.

General Chemicals

ACETONE remains in quietly steady demand.

ACID ACETIC is a turn firmer, and in better demand.

ACID CARBOLIC is weak.

ACID CITRIC still continues on its downward course, and there appear to be heavy stocks on the market.

ACID FORMIC is much about the same, with only a limited demand.

ACID LACTIC is lifeless, without any appreciable change in price.

ACID OXALIC is more steady, and some holders are now asking for increased figures.

ACID TARTARIC is in only quiet request, and price is nominally without change.

ARSENIC is firm and in short supply.

BARIUM SALTS are very quiet, and the position of chloride is again easier.

COPPER SULPHATE is lifeless, and value appears to be again lower.

FORMALDEHYDE is in somewhat better demand, and the price continues firm.

LEAD SALTS are in somewhat better request, but business cannot by any means be described as brisk, and cheap offers from the Continent appear to have slackened off somewhat.

LITHOPONE is offered at last quoted figures, but little business is being transacted.

POTASSIUM BICHROMATE has not moved appreciably, but there seems to be more prompt material available.

POTASSIUM CHLORATE continues dull.

POTASSIUM CARBONATE is in steady request, but stocks appear to be light.

POTASSIUM PERMANGANATE is quiet and easy.

POTASSIUM PRUSSIATE is in better demand, but price is without change.

SODIUM ACETATE is in only small request, and price is inclined to be easier.

SODIUM BICHROMATE is in fair demand, and price is easier.

SODIUM CAUSTIC has substantially improved on the week, and high prices appear to be probable in sympathy with the increased demand.

SODIUM HYPOSULPHITE.—There is, perhaps, slightly more material on the market, but up to the present this has not been reflected in the price.

SODIUM NITRITE is becoming scarcer, and the price firmer.

SODIUM PRUSSIATE is again lower, with very little business passing.

SODIUM SULPHIDE is about the same, but there is not a great amount of business being transacted. On the other hand, works are contracted well ahead.

TIN SALTS have been fairly active.

ZINC SALTS are in quietly steady demand, with a fair amount of business passing for chloride.

Coal Tar Intermediates

This market is relatively without change, and values continue strong.

ALPHA NAPHTHYLAMINE is in good request, but supplies are very scarce.

BENZIDINE BASE is only in very short supply, and price is well maintained.

BETA NAPHTHOL.—The value is maintained, and supplies are very difficult to obtain for near delivery.

DINITROPHENOL is inquired for on export account, but little near business can be accommodated.

DIPHENYLAMINE is in quietly steady request, without change in value.

PARANITRANILINE continues scarce and firm at last quoted figures.

Coal Tar Products

The market remains quiet, one or two products being rather slow.

BENZOL 90's is quoted 3s. in the North and 3s. 1d. to 3s. 2d. in London.

PURE BENZOL is scarce at 3s. 4d. to 3s. 6d. per gallon.

CREOSOTE OIL is firm and in moderately good demand at 1s. to 1s. 1d. in the North and 1s. 1d. to 1s. 2d. in the South.

CRESYLIC ACID is still slow in demand, and is quoted 4s. to 4s. 2d. per gallon for the Dark 95/97 per cent. quality, and 4s. 6d. to 4s. 9d. per gallon for the Pale 97/99 per cent. quality.

SOLVENT NAPHTHA, 90/160, is now worth 3s. 2d. per gallon.

HEAVY NAPHTHA, 90/190, is somewhat more freely quoted at 3s. 6d. per gallon.

NAPHTHALENE is still in good demand, and prices have a further upward tendency, Crude being quoted from £16 to £20 per ton, and Refined from £50 to £52 per ton.

PITCH.—There is no change in the position, and very little business has been reported recently.

Sulphate of Ammonia

Business in this material is quiet, but prices are maintained.

Current Prices

Chemicals

	per	£	s	d.		£	s.	d.
Acetic anhydride	lb.	0	3	9	to	0	4	0
Acetone oil	ton	90	0	0	to	95	0	0
Acetone, pure	ton	120	0	0	to	125	0	0
Acid, Acetic, glacial, 99-100%	ton	110	0	0	to	115	0	0
Acetic, 80% pure	ton	87	10	0	to	90	0	0
Arsenic	ton	100	0	0	to	105	0	0
Boric, cryst.	ton	74	10	0	to	76	0	0
Carbolic, cryst. 39-40%	lb.	0	1	1½	to	0	1	2
Citric	lb.	0	5	0	to	0	5	3
Fluoric	lb.	0	0	7½	to	0	0	8
Formic, 80%	ton	115	0	0	to	120	0	0
Gallic, pure	lb.		8	3	to	0	8	6
Hydrofluoric	lb.	0	0	7½	to	0	0	8
Lactic, 50 vol.	ton	58	0	0	to	60	0	0
Lactic, 60 vol.	ton	72	10	0	to	75	0	0
Nitric, 80 Tw.	ton	41	0	0	to	44	0	0
Oxalic	lb.	0	2	6	to	0	2	7
Acid, Phosphoric, 1.5	ton	65	0	0	to	67	0	0
Pyrogallic, cryst	lb.	0	11	6	to	0	11	9
Salicylic, Technical	lb.	0	2	6	to	0	2	8
Salicylic, B.P.	lb.	0	3	3	to	0	3	6
Sulphuric, 92-93%	ton	8	10	0	to	8	15	0
Tannic, commercial	lb.	0	3	0	to	0	3	3
Tartaric	lb.	0	3	3	to	0	3	5
Alum, lump	ton	19	10	0	to	20	0	0
Alum, chrome	ton	93	0	0	to	95	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	17	10	0	to	18	10	0
Aluminium, sulphate, 17-18%	ton	20	10	0	to	21	10	0
Ammonia, anhydrous	lb.	0	2	2	to	0	2	4
Ammonia, .880	ton	45	0	0	to	50	0	0
Ammonia, .920	ton	32	10	0	to	37	10	0
Ammonia, carbonate	lb.	0	0	7½	to	—		
Ammonia, chloride	ton	105	0	0	to	110	0	0
Ammonia, muriate (galvanisers)	ton	60	0	0	to	65	0	0
Ammonia, nitrate	ton	65	0	0	to	70	0	0
Ammonia, phosphate	ton	130	0	0	to	135	0	0
Ammonia, sulphocyanide	lb.	0	2	9	to	0	3	0
Amyl, acetate	ton	410	0	0	to	420	0	0

	per	£	s.	d.		£	s.	d.
Arsenic, white, powdered	ton	74	0	0	to	76	0	0
Barium, carbonate, 92-94%	ton	12	10	0	to	13	0	0
Barium, chlorate	lb.	0	0	1½	to	0	1	0
Chloride	ton	32	0	0	to	34	0	0
Nitrate	ton	55	0	0	to	56	0	0
Sulphate, blanc fixe, dry	ton	25	10	0	to	26	0	0
Sulphate, blanc fixe, pulp	ton	15	10	0	to	16	0	0
Sulphocyanide, 95%	lb.	0	1	6	to	0	1	8
Bleaching powder, 35-37%	ton	26	0	0	to	28	0	0
Borax crystals	ton	41	0	0	to	42	10	0
Calcium acetate, Brown	ton	20	0	0	to	21	0	0
Grey	ton	35	0	0	to	37	10	0
Calcium Carbide	ton	30	0	0	to	32	0	0
Chloride	ton	9	10	0	to	10	10	0
Carbon bisulphide	ton	65	0	0	to	67	0	0
Casein, technical	ton	75	0	0	to	80	0	0
Cerium oxalate	lb.	0	3	9	to	0	4	0
Chromium acetate	lb.	0	1	2	to	0	1	4
Cobalt acetate	lb.	0	8	6	to	0	9	0
Oxide, black	lb.	0	10	0	to	0	10	3
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	41	0	0	to	42	0	0
Cream Tartar, 98-100%	ton	225	0	0	to	235	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol.	ton	340	0	0	to	345	0	0
Formusol (Rongalite)	lb.	0	4	0	to	0	4	3
Glauber salts	ton	Nominal.						
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	8	to	0	2	9
Iron perchloride	ton	50	0	0	to	52	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	87	10	0	to	90	0	0
Carbonate (White Lead)	ton	70	0	0	to	72	10	0
Nitrate	ton	72	0	0	to	75	0	0
Litharge	ton	58	0	0	to	60	0	0
Lithopone, 30%	ton	52	0	0	to	54	0	0
Magnesium chloride	ton	15	10	0	to	16	10	0
Carbonate, light	cwt	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	13	10	0	to	14	0	0
Sulphate (Druggists')	ton	18	10	0	to	19	10	0
Manganese, Borate	ton	190	0	0	to		—	
Sulphate	ton	100	0	0	to	105	0	0
Methyl acetone	ton	95	0	0	to	100	0	0
Alcohol, 1% acetone	gall.	Nominal.						
Nickel ammonium sulphate, single salt	ton	60	0	0	to	62	0	0
Nickel ammonium sulphate, double salt	ton	62	0	0	to	64	0	0
Potassium bichromate	lb.	0	2	2	to	0	2	3
Potassium Carbonate 90%	ton	115	0	0	to	120	0	0
Chloride	ton	Nominal.						
Chlorate	lb.	0	0	9½	to	0	0	10½
Meta-bisulphite, 50-52%	ton	270	0	0	to	280	0	0
Nitrate, refined	ton	65	0	0	to	67	0	0
Permanganate	lb.	0	4	9	to	0	5	0
Prussiate, red	lb.	0	5	3	to	0	5	6
Prussiate, yellow	lb.	0	2	2	to	0	2	3
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt.	5	10	0	to		—	
Seconds	cwt.	5	5	0	to		—	
Sodium acetate	ton	60	0	0	to	61	0	0
Arsenate, 45%	ton	60	0	0	to	62	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	9	to	0	1	10
Bisulphite, 60-62%	ton	50	0	0	to	52	10	0
Chlorate	lb.	0	0	5½	to	0	0	6
Caustic, 70%	ton	38	0	0	to	40	0	0
Caustic, 76%	ton	42	0	0	to	44	0	0
Hydrosulphite, powder, 85%	lb.	0	4	0	to	0	4	6
Hyposulphite, commercial	ton	35	10	0	to	37	10	0
Nitrite, 96-98%	ton	105	0	0	to	110	0	0
Phosphate, crystal	ton	43	0	0	to	45	0	0
Perborate	lb.	0	2	2	to	0	2	4
Prussiate	lb.	0	1	5	to	0	1	5½
Sulphide, crystals	ton	30	0	0	to	32	0	0
Sulphide, solid, 60-62%	ton	62	10	0	to	64	0	0
Sulphite, cryst.	ton	15	10	0	to	16	10	0
Strontium carbonate	ton	85	0	0	to	90	0	0
Nitrate	ton	90	0	0	to	95	0	0
Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	42	0	0	to	44	10	0
Sulphur, Flowers	ton	19	0	0	to	19	10	0
Roll	ton	19	0	0	to	19	10	0
Tartar emetic	lb.	0	3	4	to	0	3	5
Tin perchloride, 33%	lb.	0	2	6	to	0	2	7
Perchloride, solid	lb.	0	3	0	to	0	3	3
Protochloride (tin crystals)	lb	0	2	0	to	0	2	1
Zinc chloride, 102 Tw.	ton	22	0	0	to	23	10	0
Chloride, solid, 96-98%	ton	60	0	0	to	65	0	0
Oxide, 99%	ton	82	10	0	to	85	0	0
Oxide, 94-95%	ton	70	0	0	to	72	10	0
Dust, 90%	ton	90	0	0	to	92	10	0
Sulphate	ton	21	10	0	to	23	10	0

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	4	0	to	0	4	3
Alphanaphthol, refined	lb.	0	5	6	to	0	5	9
Alphanaphthylamine	lb.	0	4	0	to	0	4	3
Aniline oil, drums extra	lb.	0	1	8	to	0	1	9
Aniline salts	lb.	0	1	10	to	0	2	0
Anthracene, 85-90%	lb.		—		to		—	
Benzaldehyde (free of chlorine)	lb.	0	5	6	to	0	6	0
Benzidine, base	lb.	0	13	6	to	0	14	0
Benzidine, sulphate	lb.	0	10	6	to	0	11	6
Benzoic acid	lb.	0	5	3	to	0	5	6
Benzoate of soda	lb.	0	5	3	to	0	5	6
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	1	6	0	to	1	7	6
Betanaphthol	lb.	0	5	6	to	0	5	9
Betanaphthylamine, technical	lb.	0	11	6	to	0	12	6
Croceine Acid, 100% basis	lb	0	5	0	to	0	6	3
Dichlorbenzol	lb.	0	0	6	to	0	0	7
Diethylaniline	lb.	0	7	9	to	0	8	6
Dinitrobenzol	lb.	0	1	4	to	0	1	5
Dinitrochlorbenzol	lb.	0	1	5	to	0	1	6
Dinitronaphthaline	lb.	0	1	6	to	0	1	8
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	2	6	to	0	2	9
Dimethylaniline	lb.	0	5	3	to	0	5	9
Diphenylamine	lb.	0	5	0	to	0	5	3
H-Acid	lb.	0	14	6	to	0	15	0
Metaphenylenediamine	lb.	0	5	9	to	0	6	0
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	7	6	to	0	8	6
Monosulphonic Acid (2:7)	lb.	0	7	6	to	0	8	0
Naphthionic acid, crude	lb.	0	5	6	to	0	6	0
Naphthionate of Soda	lb.	0	6	0	to	0	6	3
Naphthylamin-di-sulphonic-acid	lb.	0	5	6	to	0	6	6
Nitronaphthaline	lb.	0	1	4	to	0	1	6
Nitrotoluol	lb.	0	1	3	to	0	1	4
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	1	to	0	1	2
Orthotoluidine	lb.	0	2	6	to	0	2	9
Orthonitrotoluol	lb.	0	1	3	to	0	1	4
Para-amidophenol, base	lb.	0	15	6	to	0	16	6
Para-amidophenol, hydrochlor	lb	0	15	6	to	0	16	6
Paradichlorbenzol	lb.	0	0	6	to	0	0	8
Paranitraniline	lb.	0	8	6	to	0	9	0
Paranitrophenol	lb.	0	2	9	to	0	3	0
Paranitrotoluol	lb.	0	5	9	to	0	6	0
Paraphenylenediamine, distilled	lb.	0	13	6	to	0	14	6
Paratoluidine	lb.	0	8	6	to	0	9	6
Phthalic anhydride	lb.	0	4	9	to	0	5	0
R. Salt, 100% basis	lb.	0	4	0	to	0	4	2
Resorcin, technical	lb.	0	11	6	to	0	12	6
Resorcin, pure	lb.	1	2	6	to	1	5	0
Salol	lb.	0	6	9	to	0	7	0
Shaeffer acid, 100% basis	lb.	0	3	6	to	0	3	0
Sulphanilic acid, crude	lb.	0	1	6	to	0	1	7
Tolidine, base	lb.	0	10	6	to	0	11	6
Tolidine, mixture	lb.	0	3	0	to	0	3	6

Alsatian Potash

CONSIDERABLE quantities of potash salts are coming forward from the Alsace mines. The following amounts were shipped to the United Kingdom during the past week: 14 per cent. sylvinite (French kainit), 7,262 tons; 20 per cent. sylvinite (French manure salts), 3,087 tons. The following prices per ton f.o.r. are quoted: Sylvinite, 14–16 per cent., £7 15s.; sylvinite, 20 per cent., £9 15s.

The French Chemical Industry

THE chief feature of the French chemical industry is the dearth of stocks. The market is disorganised and prices are fictitious. Every consumer is prepared to pay almost any price for the stock he requires. The market just now is ransacked for tartaric, citric and oxalic acids, for formaldehyde, ferro- and ferricyanides, permanganates, chromates, dichromates, bicarbonates, sulphides and sulphates of soda and potash, gums, and ammoniacal salts. Prices vary considerably, but, whenever possible, consumers themselves undertake the manufacture of products they require and are glad to take advantage of the advice of the industrial chemist.—*J. Soc. Chem. Ind.*

Company News

LIVERPOOL NITRATE CO.—This company has issued particulars of two amalgamation proposals. The directors have entered into a conditional agreement for amalgamation with the San Lorenzo Nitrate Company by which shareholders in the latter will receive in exchange for every £1 share now held one 5s. fully-paid share of the Liverpool Company. They have also entered into a conditional agreement for amalgamation with the Buena Ventura Nitrate Company. The shareholders of the latter are to receive one 5s. share fully-paid in the Liverpool company in respect of every seven shares in the Buena Ventura and also a cash payment of 5s. in respect of each Buena Ventura share. Both amalgamations are to date from June 30 this year.

MOLASSINE CO.—The report for the year to March 31 last states that since the issue of the last balance-sheet the necessary meetings have been held for the capitalisation of the £21,000 preference dividends which were then in arrear. The balance-sheet shows a profit of £23,424, and £5,968 was brought in, making £29,392. The directors have replaced £6,000 to the capital reserve fund, being the amount taken therefrom (in addition to £15,000 taken from the general reserve fund) for the purpose of capitalising the unpaid preference dividends. They have also placed £8,000 to the general reserve, leaving £15,392. Of this £7,000 will be used to pay one year's dividend on the preference share capital, and it is proposed to pay a dividend of 10 per cent. on the ordinary shares, carrying forward £892.

W. & H. M. GOULDING.—The net profits for the year to June 30 last, after providing for excess profits duty, and including dividends from subsidiary companies, amount to £84,070, out of which it is proposed to set aside £7,000 to cover estimated discounts on realisation of outstanding debts. This, with £4,517 from last account, leaves £81,587 available. After providing for debenture interest and preference dividend the directors recommend a dividend of 8 per cent., with a bonus of 3s. per share on the ordinary shares for the year, of which 4s. per share, with the bonus of 3s., is payable forthwith, and the second 4s. per share at Dec. 31 next, less tax. They further recommend that a special bonus of £700 be paid to the directors, that £5,000 be carried to depreciation account, and £25,000 to reserve, bringing that account up to £100,000, and carry forward £4,862. During the year an additional 18,000 ordinary shares were issued at a premium of £45,000, which amount it is proposed to add to reserve account.

BRITISH CELLULOSE & CHEMICAL MANUFACTURING CO.—A circular letter has been issued to the shareholders, in which it is stated that when the company was reconstituted in March it was anticipated that the directors would have been justified in paying an interim dividend on the preference shares at this time. There has, however, been so much delay in getting machinery, &c., owing to the very unsettled state of trade that the directors have decided to postpone payment of the dividend on the preference shares until their construction programme has begun to yield a large and strong revenue. It is thought that in the present financial state of the country it would be unwise to part with cash resources that are not immediately replaceable from revenue, and it is pointed out that as the shares are cumulative as to dividend the position of the shareholders in the long run has not been prejudiced. The delay in plant construction has not been (the circular states) without material advantage to the company. During this time the board has carried out a great deal of work, both experimental and in the way of development, one result of which has been to prove that the company can save considerable sums on plant expenditure compared with what would have been necessary had the original programme been carried out and, in spite of greatly increasing costs, the cash resources of the company should prove ample. Many reports have been received as to the satisfactory character of the silk produced, both as to its dyeing and weaving qualities. The company's plant for the manufacture of non-inflammable celluloid is nearing completion and is already working, and within the next month the company's celluloid products will be on the market. Good results are now expected from the full operation of the carbide factory, which, owing to the sale of large stocks of carbide by the Disposal Board at low prices, had to be operated for some time on a limited scale. The Government's carbide stocks are now absorbed.

The Nitrate Position

THOMSON AIKMAN, junr., in a circular dated August 4, state: Since July 19 the arrivals of nitrate of soda advised amount to about 7,000 tons, and about 20,000 tons are due during the next fortnight. The tone has been firm, with a prolonged demand for spot in continental consuming markets, and a fair inquiry for next spring delivery from dealers. Business is reported in cargoes at 22s. for near arrival and 23s. to 23s. 9½d. per cwt. c.i.f. for later positions. Further sales, totalling about 30,000 tons, August delivery at 15s. 11d. per quintal, have been made by the Producers' Association, making their sales since June 15 about 1,210,000 tons.

Against nitrate unshipped at June 30 and future production it is estimated that the Producers' Association have now sold for delivery up to April 1921,. about 1,750,000 tons (of which 1,315,000 tons for shipment up to December and 435,000 tons for January-April, 1921, shipment), and during the same period the non-associated producers have sold, or are likely to sell, about 350,000 to 375,000 tons. It is understood that the Producers' Association are estimated to have available a further 100,000 tons August, 60,000 tons September, and 50,000 tons monthly October to April, 1921.

A moderate business has been done in resales of f.o.b., mostly for near positions. July delivery was sold at 15s. 8d. to 15s. 10½d., August 15s. 0d., September 16s. 4d., and monthly lots September-December at 17s. per quintal. Freights continue easy with the Bordeaux-Hamburg range about 100s., and some fixtures for the Mediterranean at 20s. to 25s. per ton higher. Exchange closes at 11 11/16d. Prices of sulphate of ammonia remain unchanged.

From information recently obtained in Germany, it would appear that the annual local productive capacity of all sorts of nitrogen products (including coke oven sulphate of ammonia, which amounted in 1913 to over 500,000 tons) probably amounts to rather over 1,500,000 tons, but owing to the scarcity of coal, which is likely to take place as a result of the arrangements made at the Spa Conference, a very much smaller quantity is likely to be produced under present conditions.

Considerable opposition is being shown by consumers to contracting for their next spring's requirements, in the hope that Chilian nitrate will be available. If this eventuates, the export of a certain quantity of the synthetic products is probable.

Adam Hilger, Ltd.

WE have received a booklet from Messrs. Hilger, describing the type of saccharimeter manufactured by them. The general design of the instrument follows closely the latest European practice, and, in the main, conforms to the recent specifications drawn out by American sugar chemists for a commercial quartz wedge saccharimeter. The scale is that of the International Sugar Commission, Paris, 1900, and in realising this scale the data of Bates and Jackson are used. The polariser is a modification of the Lippich two-field type, with a fixed half shadow angle of about 6°. The disadvantage of the Lippich polariser in the past has been its liability to split or disintegrate along the sharp line of the half prism. Messrs. Hilger have now evolved a new way of cutting the Iceland spar, with reference to its cleavage planes, whereby this possibility is obviated, and this permits of a much finer separating line. The quartz wedge compensator system, upon which the sensibility and accuracy of the instrument mainly depend, has been given special attention. The range given by the instrument is from −30°S. to +110S., which is all that is required in ordinary sugar practice. The scales and vernier are of opal grass. Calibration is carried out at 20°C., the scale is engraved at that temperature, and the instrument is again finally checked against control plates for several points on the scale at the same temperature. The whole of the quartz wedge system is enclosed in a dust and syrup-proof cover, and the instrument finished with durable black enamel and lacquer specially selected to withstand corrosion in chemical laboratories and the tropics. Stock instruments are made in two sizes, to take tubes of 200 mm. and 400 mm.; and instruments to take 600 mm. tubes can be made to order. Accessories in the way of quartz control plates and polariscope tubes are described in the catalogue. Prices are also appended.—75A, Camden Road, London, N.W.1.

New Companies Registered

The following have been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C. :—

ODAMS' NITROPHOSPHATE & CHEMICAL CO., LTD., 5, Mark Lane, E.C. Makers and rectifiers of sulphuric acid and sulphate of ammonia, &c. Nominal capital, £25,000 in 25,000 shares of £1 each. Directors to be appointed. Qualification of directors, £1.

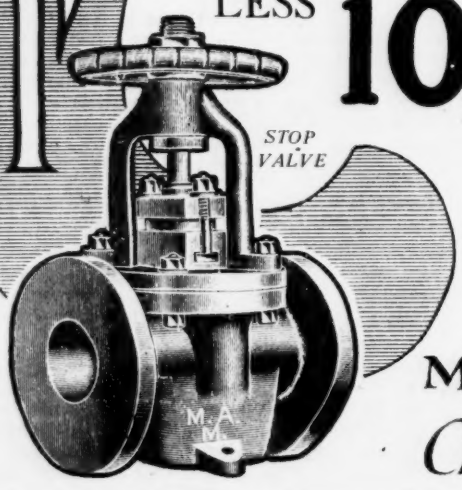
BELL'S ASBESTOS EASTERN AGENCY, LTD., 34, Fenchurch Street, E.C. Dealers in asbestos goods. Nominal capital, £43,020 in 43,020 shares of £1 each. Minimum subscription, 7 shares. Directors: A. G. Angier, H. R. Preston, E. C. Lane, G. W. Giles, T. Thomas. Remuneration of directors, £75 each; chairman, £100.

PEACHEY PROCESS CO., LTD., 40, Gerrard Street, W.1. An agreement for the sale of a patent for a process for the cold vulcanisation of rubber. Nominal capital, £250,000 in 245,000 shares of £1 each, and 100,000 shares of 1s. each. Minimum subscription, 7 shares. Directors: Sir. J. P. Hewitt, C. S. Baring-Gould, E. L. Downing and four others. Qualification of directors, £500. Remuneration of directors, £300 each; chairman, £500.

The Perfect Acid Valve

Regulus Metal

Acid Valves



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